Radio Guide

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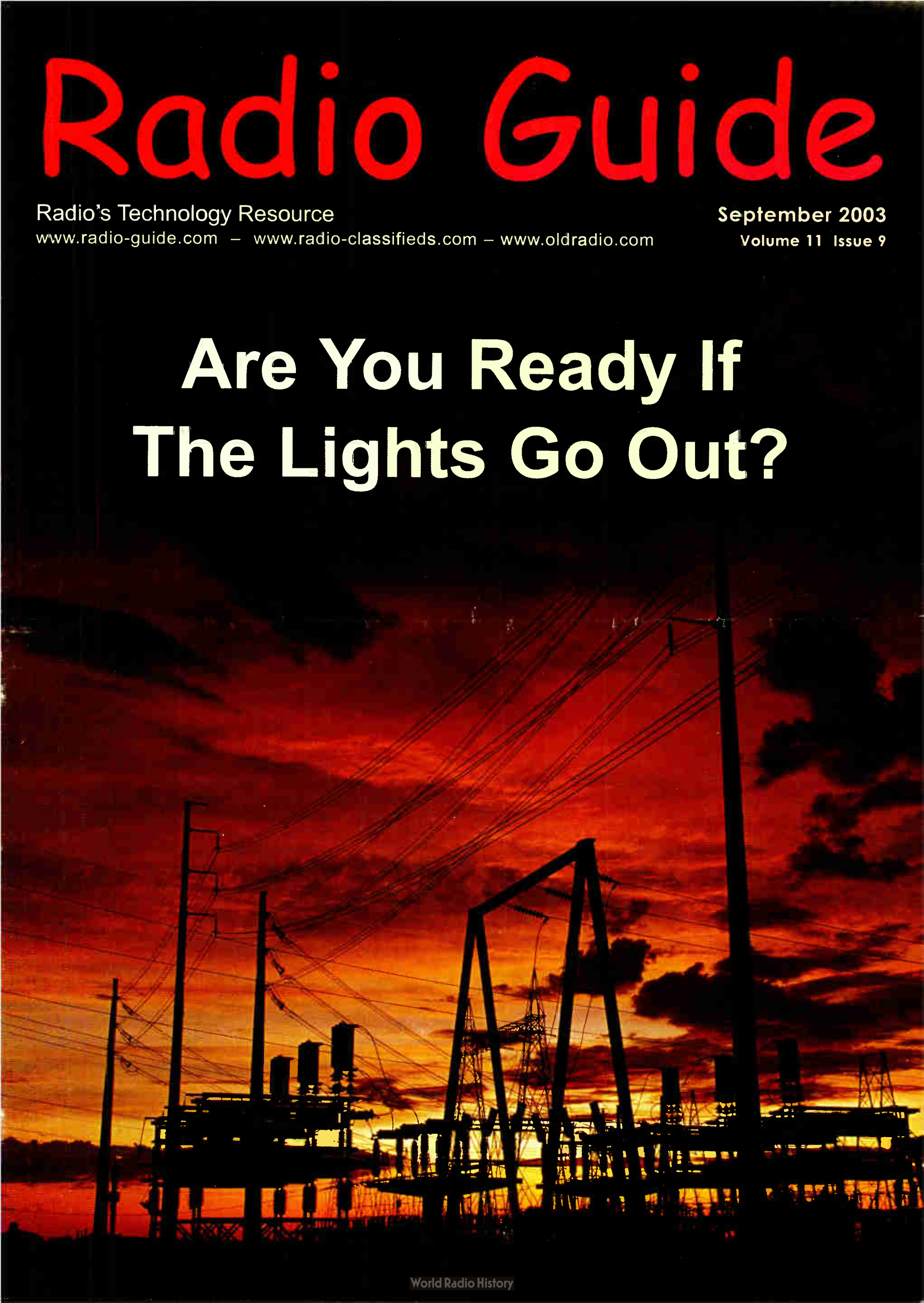
September 2003
Volume 11 Issue 9

Are You Ready If The Lights Go Out?



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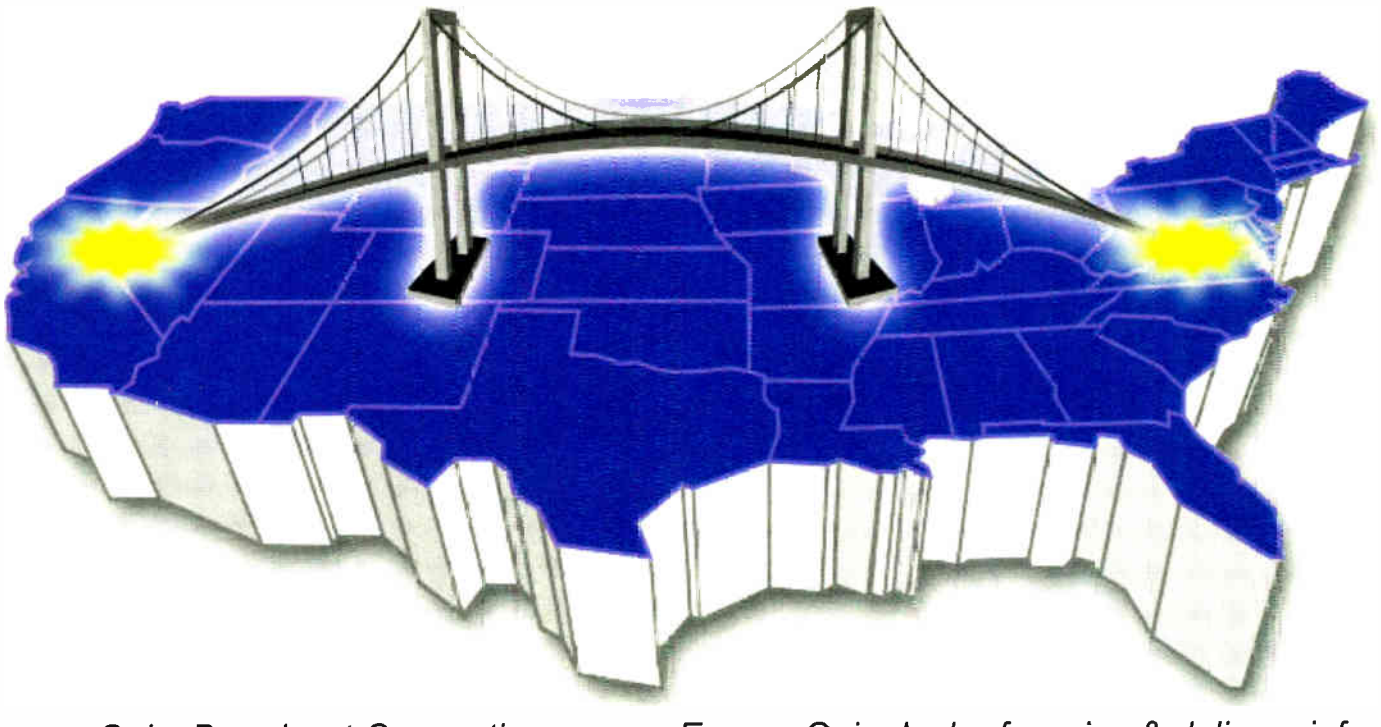

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Columns & Articles

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Volume 11 Issue 9
September 2003

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Economic Stress Season

September ushers in the Fall Convention Season, a time when a whole series of NAB, SBE, even State Broadcast Association conventions are compressed into about two months. Of course, it is impossible for anyone to make it to all the different gatherings, even if there was enough money budgeted for it. There are even some who think there is no longer a need for any of them: "The Spring Show is enough!"

That may well be an extreme viewpoint. Certainly it is true that with some of the larger broadcast companies reducing their presence at these events, attendance and booth traffic is lower, and there is less manpower to ensure high quality programs. On the other hand, most conventions generate a profit, guaranteeing they will continue as long as the manufacturers come back and the bottom line is black.

The manufacturers. Remember them? They are the ones you want – no, need – to be around to support their gear when you need parts and information. Yet, the industry has squeezed manufacturers between companies demanding the lowest prices for equipment and industry associations who want the most for exhibition space. Even as stations cut back on spare parts and/or loyalty to specific manufacturers, the costs of exhibition continue to increase. These costs, all have taken a toll. Just count the booths.

In market after market, stations are finding local advertising harder to sell. Mom and Pop shops – entire downtown shopping areas in many places – are disappearing. Have you tried lately to get your vacuum, sewing machine, or computer serviced? Moving up the chain, is it possible broadcasters and associations could destroy their supply chain?

It is something worth serious consideration during this Convention Season.

Blackout!

Will You Be Ready For The Next One?

by Dana Puopolo

Especially since the 1960s, modern electrical networks – or grids – have become the cornerstone of life. Americans largely take for granted a dependable electrical system supporting factories and sophisticated office equipment, climate controlled, high-rise buildings, and "all electric" home. Then came November 9, 1965, and an awakening that "things could happen" to the electrical supply. [Ed.]

[SANTA MONICA, California - September 2003] The original "Great Northeast Blackout" occurred in November 1965, nearly 38 years ago. Utilities scrambled for six days to locate the faulty relay that took down the power feeding some 30 million people and 80,000 square miles in the Northeast US and Canada. Expert panels were set up to explain what happened, and prevent a reoccurrence.

Yet, on July 13, 1977 a series of lightning strikes plunged New York City into another hot and (sadly) violent night, noted for looting, arson and general violence in some parts of the city. After another postmortem, engineers set up more procedures, declaring the danger over: "It will not happen again."

Guess what? On Thursday, August 14, 2003, it did. In under 15 seconds, up to 50 million people in the United States and Canada lost all electrical power. Worse than in 1965, it took days to fully restore power – after a week there were still rolling blackouts and other problems. How could this happen again? How did it impact broadcast stations and other communications? And, finally, how can we prepare for when the next one happens? This article is the first in a series with some answers to these questions.

THE POWER GRID

In North America, the power system is made up of three distinct grids: Eastern, Western and Texas. (By far the smallest of the three, Texas chose to keep its system within the state, and avoid some of the complications of complete Federal regulation.)

Power grids are made up of interconnected power generating stations, high voltage transmission lines (sometimes called high tension lines), and substations (which either boost or reduce AC voltages). The Eastern grid is the oldest of the two main ones and uses AC voltages for long distance transmission, while the Western grid has been moving to DC voltage for quite some time. (The advantage of DC is simply that you can transmit about 20% more energy for a given voltage with DC, even discounting the inefficiencies of commutating it back to AC on the other end).

Most high voltage lines on the grid operate at from 375 to 500 kV. All operate as matched transmission lines in a three phase configuration. For lightning protection, all have a grounded wire called a "high wire" that runs from tower to tower at the very top.

One of the unfortunate things about electricity is that unlike other forms of energy it can not be stored easily. It must be used as it is generated. Since power demands in a given area can rapidly change, it is not practical to completely localize power plants. Instead, all power is put into the "grid" and all users draw from it.

So if New York City has a large demand for power due to a hot day, normally it would draw power from a generating station in say Detroit or Chicago, where the demands may not be as great. This maximizes efficiency by keeping plants running at their proper output rather than having extra plants going on and off line to meet demand.

Normally the grid works well, with power flowing from where it is being made to where it is needed. Of course, once in a while the "grid" is taxed when many areas require additional power at the same time. And transmission lines sometimes can be taken out of commission due to storms, wildfires or lightning. When this happens, automatic switches reroute power to other lines or cut off substations (called "load shedding") to lessen the drain on the grid.

For the grid to work properly, the plants supplying power to it must have the same frequency and phase. If they did not, their outputs would not add together properly (a practical reason why DC works better on long distance transmission), and might result in one plant "bucking" the output of another, resulting in both of them shutting down.

North American power runs at 60 Hz. Before a plant can hook up to the grid, its output must be synchronized to the grid. This is done by comparing the frequency and phase of the grid and matching its generators to it. If a plant's frequency changes by more then a Hertz from nominal, it is automatically disconnected from the grid.

Actually, the frequency is *allowed* to drift slightly to allow for a certain amount of "slack" in the mechanical generators. Over time, it is averaged to 60 Hz. This is why your AC powered clock may not be exact one day but correct on the next. Usually the slack is not more than +/- half a Hertz or so, and since the whole grid moves up and down it is of little matter.

THE SYSTEM WOBBLES

From what is known thus far, August 14, 2003 began as a fairly normal day, power wise. A hot spell in New York City required a power flow from west to east along a transmission corridor known as the "Lake Erie Loop." The Lake Erie Loop is a major interconnect (encircling Lake Erie) between the large generating stations in the Midwest and Niagara Falls, and feeds the states of Michigan, Ohio, Pennsylvania, and New York, New England, and the Provinces of Ontario and Quebec.

Shortly after 3 PM EDT, engineers noticed a series of voltage interruptions on the "loop." These quickly corrected themselves and were likely written off as "glitches," possibly caused by lightning (thunderstorms are common late in the afternoon by the lakes). A half hour later, one of the lines cut itself off the grid – somewhat of a concern, but not a major one by itself as the loop has built-in redundancy by virtue of its lines running two completely different geographic paths around the lake. The load automatically transferred to another set of wires within the corridor.

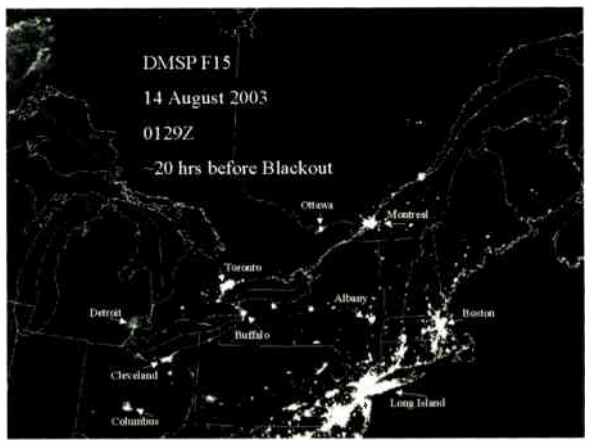
From this point what happened is less clear. Apparently a few seconds before the blackout, the loop was supplying 300 megawatts from Detroit area generating plants to Niagara Falls, added to output produced there and then sent down-state to NYC. For some reason no one yet understands, the power flow abruptly reversed. Instead of the plants in Michigan supplying power now, they found themselves in a position of having to *absorb* 500 megawatts of power coming back at them!

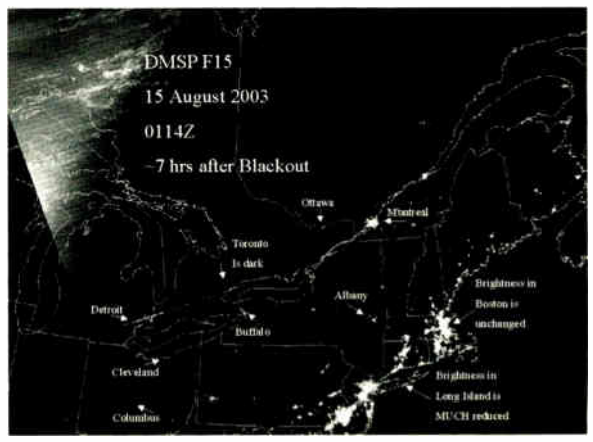
CASCADE FAILURE

Quickly, the plants and the entire "loop" shut down automatically, but not before damaging some power plants in the Detroit area. (Generator seals blew there, explaining why power restoration took longer in the Detroit area). With this 300 megawatt supply gone, yet the regional power demands remaining, generators in Niagara Falls quickly loaded down. At one of the plants at the Falls, the plant manager watched the frequency of his generators rapidly drop from 60 Hz to 57 Hz, then drop off the grid just as quickly. Once this began, the resulting "cascade" of power generating plants loading down and dropping off the grid was inevitable, just like dominos falling.

Many ask why new software installed recently designed to break the larger grid quickly into smaller segments did not function. Actually, it did in some cases; most of New England and Pennsylvania were unaffected. My personal conjecture is some software might well have been installed incompletely or improperly, or the system crashed or was hacked.

The switches within the grid are all controlled by computers, and therefore the power reversal most surely was caused by a "glitch" of some kind within the control system. *(It already has been disclosed that some of the alarms in the Cleveland area were not operating properly. Ed.)*





BLACKOUT!

How did the Broadcast and Communications industries cope with the blackout? In a nutshell: not well. Many stations lost power at the studio, transmitter or at both locations. Others came back on the air via generator only to trip off a short time later. Radio seemed to fare better then TV, although CBS in NYC was a shining beacon in the darkness. Its 2 megawatts of auxiliary power functioned flawlessly; obviously it is load tested regularly.

Of course, most listening was on battery powered radios; in NYC the call letters WINS, WCBS, WABC and WOR seemed to be frequently mentioned by the public. In Toronto, Cleveland, Detroit and Buffalo, the stations that stayed on the air all seemed to be the big 50 kW AM outlets, proving once again the value of these stations within their communities.

In smaller cities like Rochester, Syracuse, Akron and Ottawa, there seemed to be one or two standout stations and a lot of dead air and static on the rest of the bands. I would imagine there will be both a few backs patted and a few heads rolling depending on the individual situations.

The communications facilities seemed to do a bit better. Public Safety communications seemed to hold up well, though burdened more then usual. The wired telephone network also seemed to do well, while some cellular companies (notably AT&T Cellular) showed their lack of auxiliary power capability by quickly going off line completely. Finally, a comment needs to be made about the people affected by the blackout. News reports I saw universally praised people for their behavior, and how they helped each other out. This was very good indeed.

Next month, we are going to begin the discussion of what you can and should do to make your station cope better with a loss of power, whether momentary or catastrophic.

Dana Puopolo has been a broadcast engineer for over 30 years, building, operating and maintaining radio and television plants of all sizes. He can be reached at dpuopolo@usa.net

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Audio Processing From the Ground Up

Part 9 – The Rock and The Pin

by Cornelius Gould

[CLEVELAND, Ohio - September 2003] Imagine you are at a table, and in one hand, you have a five pound rock. In the other, you have a straight pin. *This* is the key to understanding an important part of digital audio as used in broadcasting.

High Tech Tools to Understand DSP

In Part Eight, we reviewed some definitions for some of the most common things a DSP (Digital Signal Processor) engineer has to keep in mind when designing the latest kick-butt version of a broadcast audio processor. This month we will begin to delve into what all of this means (as well as a few remaining definitions), and how it all relates, hand-in-hand, with the new worlds of webcasting and HD Radio.

DELAY

When working with digital audio equipment, there always is the issue of delay. That is because there is a short amount of delay inherent in digital systems of all kind, regardless of the exact algorithms employed; it cannot be avoided. Perhaps you recall last month's examples of how sample rate works? Returning to our film analogy, let us imagine digital audio samples as individual frames of a movie. Now, assume these frames of film can be created instantly "on the fly" inside the camera (the system input). The film then ticks its way through to the projector which is playing the pictures back on a screen (the system output).

In operation, digital audio is very much like that movie film. You can easily understand why there is a delay inherent to the concept of real time digital encoding and decoding. It takes a certain amount of time for each frame to be created in the analog to digital converter (A/D Converter), and passed onto the output digital to analog converter (D/A Converter).

Thus, whenever a DSP device manipulates the bits of digital data to create an effect, it takes a certain amount of time to do the "number crunching" on the raw binary data. The delay of just encoding and simultaneously decoding digital is extremely short, and is *barely* noticeable. The amount of delay in this example varies with the sample rate, plus the amount of time it takes to digitally anti-alias filter the input audio.

DSP speed in digital audio processing is also determined by the clock speed needed to run the DSP. The faster the DSP can "clock" through the lines of code necessary to perform a particular set of functions, the faster the result happens. This is because the instructions of program code tick through the DSP (and each line is executed) at the clock rate (also called cycles). The second factor that determines speed, as you might well have guessed by now, is how many lines of code are required to "pull off" the desired processing effect.

This is also what computer people mean when throwing around terms such as "2.1 GHz processor" in a computer. That number refers to the clock processor speed. The faster the speed, the faster the computer can clock through the millions and millions of lines of code that make up not only the Operating System, but the programs you run on the Operating System. At any rate, back to our main subject: audio processing.

DELAY AND DJs

Using a digital audio processor and its resulting system delay in broadcasting becomes a big issue for some radio stations as their staff – from DJs to traffic reporters, to anyone else out in the field – have to use the off-air signal for program cues. If you introduce too long a delay, the delayed audio then becomes a distraction to the announcers who have to listen to themselves off air through headphones (which is the output of the DSP audio processor). This introduced a goal for DSP engineers to balance what they would *like* to do versus how many DSP cycles it takes to do it to try to keep the total system delay to some 'ideal' amount that would be acceptable to on-air staff.

Delay may not be much of an issue in a few years if HD Radio strongly takes hold. This is because the new world of broadcasting digital audio over your main channel has a large time delay by design. Why is that so? Why deliberately delay your audio for digital radio? Answering this question brings us to the perfect point to finally get to what you have been waiting for: HD Radio, webcasting, and the DSP based audio processor!

HD RADIO and WEBCASTING

The basic thing to keep in mind about webcasting and HD Radio is that these services are based on the transmission of digital audio where most of the audio data has been removed. The name of the game here is "how to hide this fact from your ears!" This is done through the use of a perceptual audio CODEC (Coder/Decoder).

Many people in the broadcast industry do not seem to realize the bit rate reduction systems in use today (such as Apt-X, MPEG, and now SBR – for HD Radio) are *not* analogous to the ".zip" process commonly used for "zipping" and "unzipping" computer files. The computer file "Zip" process compresses the files by removing redundant data. The "unzip" process expands the file back to its original un-compressed state at the receive end.

Audio data reduction schemes are all based on reducing the data in the digital version of the audio in such a way that it can be played back *as reduced* and hopefully sound like it did in its original form.

The function of audio data reduction is commonly called "encoding." The playback of these files (ironically) is called "decoding." So, to use a working example, an MPEG Encoder will take the audio, and reduce its data size using an MPEG Format (such as MP2, MP3, or AAC)). The Decoder simply converts this data-reduced audio back to analog. No real "decoding" ever takes place.

Encoded audio frequently is measured in terms of the "data rate" of the finished product. This rate is typically expressed in "Kilobits Per Second", or kbps. The data rate basically spells out how much bandwidth is needed to pass the finished product through the delivery method of interest.

The process of data reduction definitely has its limitations. It is possible to encode an audio file so that it is indistinguishable from the original. The only drawback (for real time digital broadcasting) is that while the file is smaller, and still sounds like the CD, the amount of data is still too great to fit on an RF carrier without exceeding government-imposed bandwidth restrictions.

As a reference point, here are the current maximum bandwidth restrictions for the different digital delivery systems currently used for broadcasting:

- FM HD Radio –96 kbps
- AM HD Radio – 30 kbps
- Internet Audio – 20 to 128 kbps
  (dependent on end user connection speed)

While the Internet can support more bandwidth to get you closer to the ideal bit-rate, two things that will hold you back are:

1. Most people do not have the available bandwidth to listen to enjoy it.

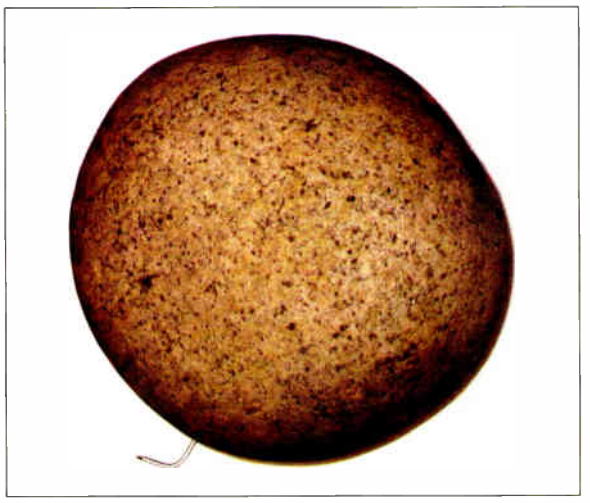
2. It costs a small fortune on the broadcaster's part to supply such a huge amount of data to hundreds of listeners at the same time.

Linear digital audio (44.1 kHz/16 Bit Stereo) is 1411 kbps, so as you can see, there is no way in the world linear audio will ever fit through the "pipe" of current digital broadcast delivery systems. We are in a world where digital bit rate reduction is a must. So, we must understand how to get the most out of it, and audio processing – more specifically, the *right* kind of audio processor – plays an important role in getting us there!

REDUCING THE BIT RATE

The bit rate reduction schemes commonly in use function by using a series of algorithms to determine how much data can be removed without (ideally) the listener noticing. This particular art is generally called "perceptual coding," and an introduction behind the concept can be realized in this example:

Imagine you are at a table, and in one hand, you have a five-pound rock. In the other, you have a straight pin. You drop the rock, and you hear it hit the table. Then you drop the pin, and you can hear it – yes, softly – hitting the table. However, if you drop both at the same time, the sound of the pin drowns out the rock. Well, not really! (You *were* paying attention, right?) That is not what happens, is it? Instead, as far as the listener is concerned, the pin might as well not even have been there at all!



There – that is my "intro to perceptual coding" way of describing the basis behind the theory of perceptual coding.

The art of perceptual coding is very much a blend of art and science. Just like audio processing!

In order to understand how to use an audio processor with a perceptual coding system, it helps to understand a little of what's going on "under the hood." In the next article I will focus my discussion on the two compression formats we are most familiar with as broadcasters, the MPEG Layer 2 and Layer 3 (mp3) systems. We will pick them apart a little bit, and hopefully shed some light on things.

Once we review what's going on, we'll look at how audio processors can help to make compressed transmissions work a little better. Maybe we can help you get that Internet stream sounding better! This will also apply to HD Radio too, so get your notebooks out, and sharpen your pencils, class!

Cornelius Gould has a passion for audio processors, and has built his own! He is the Chief Engineer for WJCU 88.7 FM in Cleveland, Ohio, as well as Senior Staff Engineer for Infinity Broadcasting, Cleveland. You can reach him at: cg@radiocleveland.com

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Building a Digital Studio

Part 2 – Digital Conversion

by Mark Lucas

[KNOXVILLE, Tennessee - September 2003] It is hard to forget one of the first CDs I ever saw. While standing in a record shop, looking suspiciously at the shiny disk, it was pronounced that these things were just about indestructible. Upon hearing this, a young teenage girl promptly picked up the disk and flung it like a Frisbee right out into the street. Before a muscle could be moved – you guessed it – a car roared up the street running right over the disk and smashing it to indestructible bits. Pun intended.

The CD was probably the first digital audio most of us heard. The early story was "perfect audio forever from an indestructible CD." And it seemed the first players on the air did sound pretty good. But we quickly found the indestructible part also did not apply to DJs in a control room. Skipping songs were soon as common as worn out styli.

The good news is that if you compare some of the more recent CDs on the market (particularly from some of the specialty labels) with the CDs from the first few years, you may be very, very surprised at how much more perfect "perfect" is today. How can that be? Well, experts credit the lessons learned in the design of the filtering used at several stages of the production and playback process. Also learned has been the importance of jitter and clocking accuracy through a system.

TIMING IMPROVEMENTS

That lesson can also be applied toward improving our digital broadcast chains. Think of an automation system, a digital audio switching system, an audio processor and an STL all trying to stay in perfect lock step to an incoming clock pulse. Visually it is a lot like a high school marching band trying to stay in step.

We are not only asking it to receive and use the incoming clock pulse to an extremely precise timing, but we want it to ignore any transient information or slight inaccuracies, and then we also expect it to send the pulse flawlessly down the line to the next component. In the real world, what can happen through the equipment chain is that a device may not be completely able to recover what the clock is telling it and may very briefly unlock and relock on the next few clock cycles.

Early digital components sometimes had very audible problems with unlocking from jitter. Current technology has much fewer problems in that respect. Nonetheless, I suspect digital glitches will be with us for evermore, although jitter today is more likely to be causing us slight audio degradation than unlocking problems. A master clock timing system can have a positive impact on audio and help us avoid the problems from jittery internal equipment clocks.

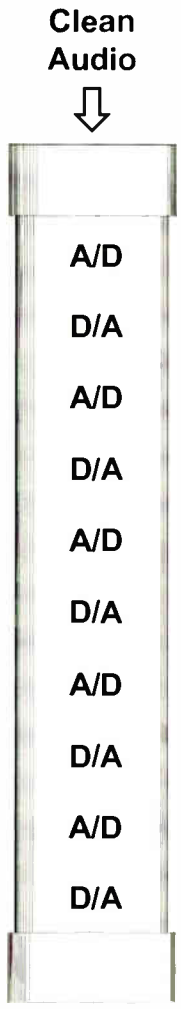
In the typical broadcaster system, the switcher acts as the master clocking device, and all other devices look at the timing coming in on the AES information.

A master clock timing system is built for the sole purpose of originating a clean clock source and distributing it via a separate coax run or balanced pair to a clock input on each piece of digital equipment, independent of the audio information. Time and time again (get it?), this can have a positive impact on audio and help us avoid the problems from jittery internal equipment clocks.

CONVERSION

In the drive for high quality audio and design of a new digital system, one important place to look at is the number of times that we convert audio from digital to analog or from analog to digital. Every cycle of conversion is a key place of possible audio degradation. Add in the bit rate reduction inherent in some systems and you really have potential for perfect frequency response – but flawed audio.

One facility with which I have been very familiar is an example of how *not* to have a system. Production room material went through an analog console, sometimes with audio from DAT or CD. The console output went to an automation using APT-X compression. It was played back on-air or sent on as a production cut, going out from the automation analog output over a digital satellite backhaul as a MPEG2 stream. It might then hit air through a digital processor on another station.



Or, if it was still in the production domain, it would be rerecorded into another automation with another APT-X stage. In this system, if you count the A/D and D/A cycles for a song dubbed into the system on CD, you find it went through *seven* cycles to get broadcast. A piece of production however, could find itself going through *ten* conversion cycles or more with three cycles of compression. The end result was audio that while not real bad also just could not be made to sound good.

So today when the production room guy reports he does not hear anything wrong with the MP3 commercial that he just received, I simply know how much more education we need for our staff before we enter the age of reduced rate transmission broadcasting.

The staff needs to understand that the end result is the product to judge, that changes will take place all the way down the broadcast chain with each bit rate reduction of the digital signal. And they need to understand how today's normal audio processing can expose the masking decisions made in the MP3 process.

DISTORTION SOURCES

Let us take a moment and clarify the difference between analog audio distortions and digital audio distortions. Vinyl analog audio had wear problems stemming from heavy play on equipment designed for durability over high quality. Frequency response extremes were challenging, bearing rumble was often audible and the extremely important stylus alignment was often wrong.

Tape-based playback sometimes would include these same elements since the original dub came from vinyl. Then add tape path problems with wow and flutter from worn guides and heads, throw in a dirty head and the somewhat limited S/N (signal to noise) and it is no wonder the first CDs sounded cleaner on the air. CD playback provided much better frequency response at both extremes and a much improved S/N.

Describing digital distortion is a much more subjective evaluation than technical measurement. Early digital often had an aggressive, maybe grainy character to treble elements. This could make the character of a cymbal unnatural and be less representative of the original sound. This was obvious enough to music studio engineers who are able to hear the difference between the live and playback sound. As a result, they kept their analog multi-track decks. Another problem with 16 bit digital is the decay of sound is not right and low level audio gets lost.

Bit rate reduced systems rely on a number of mechanisms to achieve the lower throughput. Among these are the use of perceptual mechanisms of the brain and ear which cause louder sounds to mask lower level information. That may well be one of the major rubs when the reduced rate systems are played back though our common audio processing. The processors changing of the levels between audio bands can tend to expose some of the things that were done in the bit rate reducing process.

ANALYZING AND IMPROVING DIGITAL AUDIO

A very effective and under-appreciated diagnostic tool is the human ear. Take the time to compare material and listen for not only the changes, but how *real* it sounds. You pretty well know how your announcers sound; listen to the output of their microphones, compared to the playback of a variety of MP3 playback rates. Putting together an evaluation and discussion session with your air staff could open some eyes as to the issues.

Today in digital audio there seem to be two seemingly opposite moves afoot. One direction is the sample rate reduction of MP3 and of the HD radio and the other direction is the technology allowing higher sample rates and bandwidths for the increased quality. While they certainly are opposite ends of the spectrum, each has its place, and both prove to be valuable.

With storage mediums like DVD-A and DSD having greater resolution and capacity, drive space getting cheaper and cheaper and the hardware cost of higher resolution products coming down, we may be able to present the best quality audio possible to the HD radio transmission stage. Following the logic of carrying the best quality through ever stage as far as possible may well apply here: Manufacturers are looking at making possible sample rates in their equipment higher than the now common 44.1 kHz.

What about Multi-Channel audio in broadcast? As in more than two channel? Yes, in some of the enhanced layers of encoding possible for broadcast through the HD radio system this is possible. So while designing new facilities, we do need to recognize we could quickly see a demand for more speakers, amps and channels for mixes. It is easy to imagine how station imaging and commercial production could move in this direction.

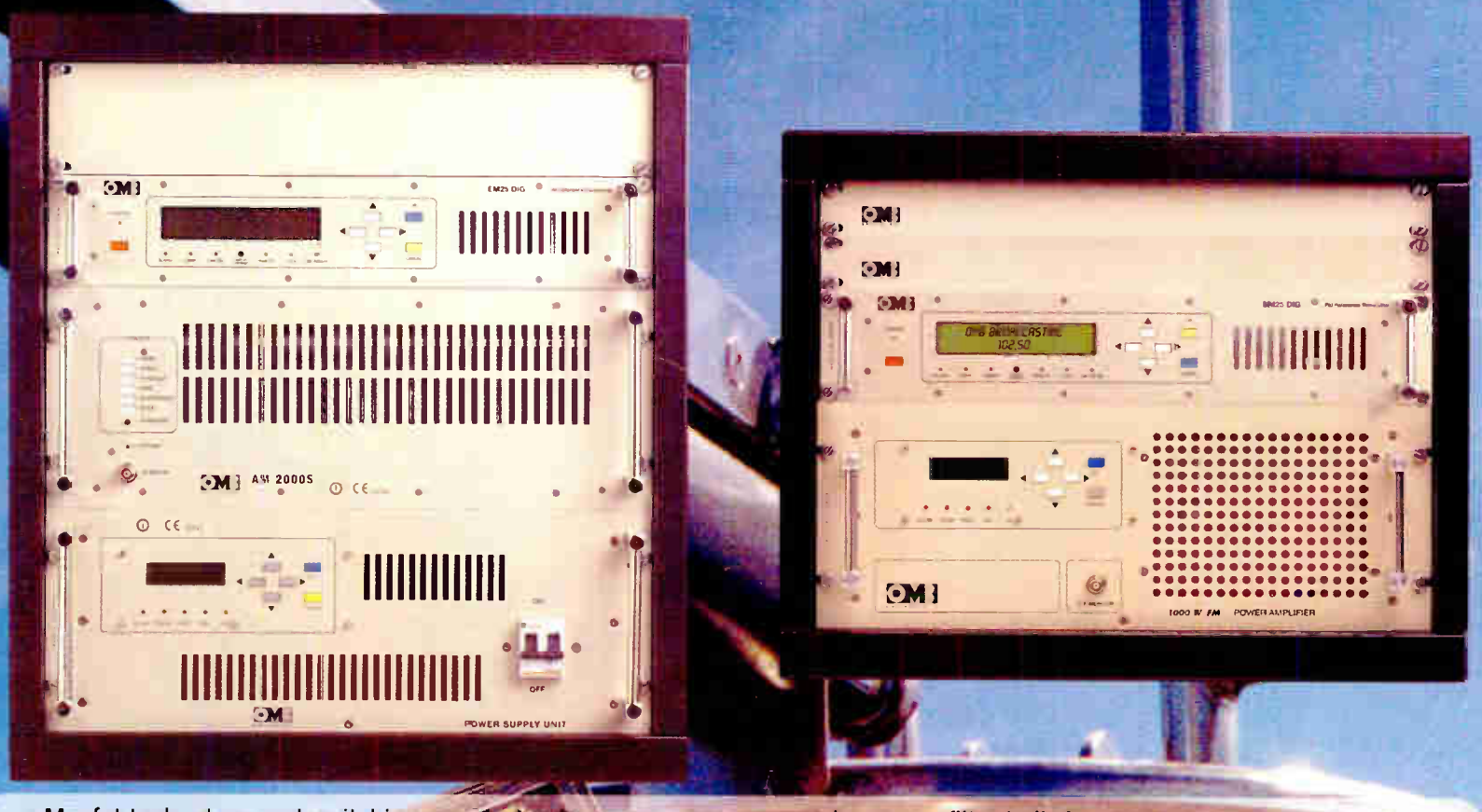
CONNECTING THE PIECES

The Logitek engines installed in my facility have the ability to be ordered with a variety of different terminations for the audio and logic. You can get 66 punch blocks, XLR or bare ends for your own style of termination; logic can go to the 66 block or termination of your choice. With several audio cards in each chassis, some digital and some analog, remember the number of in and out points with left and right for analog will rapidly grow be pretty large. Plan carefully – a nice neat install with labeling for ease of use and growth may be made easy or broken by choices at this point.

In my case we opted for connection to all be done with the StudioHub system from Radio Systems. It is a very neat system that can be carried out to the degree you choose for your facility. Analog or digital, with or without power for outboard devices, can be carried on a single, shielded Cat-5 cable. If you opt for using the outboard accessories you can get headphone amps,

(Continued on page 10)

HIGH TECH, HIGH QUALITY



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Building a Digital Studio

Continued from page 8.

unbalanced to balanced level converters, digital converters and so on.

StudioHub also made up our engine audio cables to RJ-45 to the length desired. Another of the really nice things we used was a break out box for the output of the automation audio card. A SCSI type cable runs from the audio card to the breakout box and then you have nicely labeled "in" and "out" RJ-45 jacks to run to the engine connection points.

The logic connections are very straightforward and allow you to connect your automation style logic to run your console in the conventional ways. With my engine and automation together in an engineering rack, logic only had to loop a few feet and did not have to be routed to the control room. The other connections to the engine are RS-232. A pair of RJ-45s are all that are necessary for the complete console connection. Another RS-232 connection can be permanently used for a control computer to look at the engine state and program it.

My Scott Studios automation has its logic come out on an interface box that gives you a connector strip to connect your logic wires too. So interfacing to the punch block that I used for the engine logic only required a jumper between a very few rack positions. With a few pairs between the console channel "on," "off," and "next" were taken care off.

Logic at the studio end is available from a connector on the console power supply. No extra connections are necessary to run to the rack area, it is all handled on the cabling that runs the console. So once again logic can be brought out to your choice of terminal, perhaps a 66 block. Studio warning lights and so forth also can be handled in this fashion.

Your EAS unit can be mounted either in the studio or at the rack end since logic interfacing is possible at either end. All that is necessary is tying the logic together and then an audio output from the EAS into the engine. The really sweet part is that you do not have to put the unit in-line to operate this way. So the analog unit does not require the whole chain to be converted back to analog and then return to digital. When the engine receives an activation on the logic, it flips the EAS audio to air and drops the normal on-air audio.

QUIETER STUDIOS

Early on, we made the decision to mount all our computer chassis out of the studios to reduce noise to acceptable levels. The KVM extender is what makes this possible. With a single Cat-5 connection from rack to studio, you can remote the keyboard, mouse and touch screen.

However, one problem I ran into was what to do about CD burning for production. The audio players could work, but they are more expensive and require real time burning. An answer that I found was extending a USB port in a similar fashion to the KVM extender. While a very few models are out there at the USB 1.1 spec, I was concerned about the throughput necessary for a burner. Eventually I found a model from Evergreen meeting the USB 2.0 spec. And, extending a USB hub to production requires only a single Cat-5 run from rack to studio. It has proven to be very successful at allowing production to use a USB based burner remotely from the computer with the speed they expect.

Next time we will move into the control room, and see how a totally digital studio (aside from people and their microphones!) can provide more flexibility and higher quality program audio.

Mark Lucas is the Engineering Manager for the Journal Broadcast Group stations in Knoxville, TN. He can be contacted at: mlucas@journalbroadcastgroup.com

Full Duplex

What to Say to Get What You Want

by George Nicholas

[CEDAR RAPIDS, Iowa - September 2003] It was 7:35 AM on a Monday morning when Murph the Engineer pulled into the station parking lot. It was a nice summer morning – a good day to get caught up after several days of storms.

It was no surprise Chip owned the car in the best parking spot. The young, energetic Sales Manager was known for his crisp, white Brooks Brothers shirt and tie, spit-shined $200 loafers and the brand new vehicle with vanity plate "ISELLAIR." As Murph passed by Chip's office, Chip was already on the phone, setting up a meeting with a client. "Lucky guy," Murph thought as he walked down the hall. "There's a guy who can pretty much name his price."

This time we are going to explore the ideas of Sam Deep and Lyle Sussman, authors of a book by the same title as this article. Since they were here first, I will give them and Perseus Books credit.

We mention Sales Manager Chip because he is known for saying the right thing to get what he wants. As technical people, we have every right to assume the same talent. To get there we will use something Sussman and Deep describe as "The 10 Commandments of Change." These are such powerful words we will focus on only the first five today, with the rest next time.

> *When you expect the best, it is easier to attain it.*

COMMANDMENT 1: *EXPECT THE BEST*

Never negotiate excellence. You deserve to be the best you can be. If others prevent you from achieving your best, you must help them realize that both of you will suffer by settling for mediocrity. Okay, that sounds good in theory, so why do we violate this Commandment? First, many of us feel we do not deserve excellence, or cannot attain it. Perhaps we have become cynical. Face it: second best is much easier! Or – perhaps our bias has conditioned us to set low standards.

How do we implement this Commandment? First, stop living in the past. The only thing you can and should do with the past is learn from it, because it is unchangeable "history." Instead, commit yourself to personal development goals. They do not have to be job related. Perhaps you want to learn a new language, CPR – whatever expands your horizon. Do not accept excuses without solutions. When you expect the best, it is easier to attain it.

COMMANDMENT 2: *LISTEN BEFORE TALKING; THINK BEFORE ACTING*

Did you know your ear keeps your foot out of your mouth? And all this time you thought it was just for hearing better! Ask questions; then *listen* to the answers. You cannot achieve this goal if you are not listening, or if you are acting irrationally.

We often violate this Commandment because we do not believe in listening to counterarguments; what we have to say is more valuable than what others say. Or, we give in to anger and frustration. Bottom line, we are more concerned with our needs than the needs of others.

We can implement this Commandment by changing our attitude toward listening. Give others the opportunity to vent. Gain knowledge about the right thing to say in response. Accept ideas from others that will help you solve your problems. Practice "active listening." That is, focus on the other person and block out competing thoughts. Ask questions in return. Repeat what you have heard, and offer feedback. Above all, control your anger and frustration. Nobody responds well to anger, no matter how justified it may be.

COMMANDMENT 3: *GET TO THE POINT*

A common reason we fail to move people is we do not tell them where we want them to go. (Okay, no wise cracks!) Often, we are afraid to state our expectations. Or we assume others know what we want. Perhaps we do not even know what *we* want!

Getting to the point requires four easy steps. Picture the change you want. Know why you want the change. Tell the person the problems resulting from status quo. And finally, ask for the change you want in specific terms. Do not forget to ask for feedback. This is only fair if you are asking for change.

COMMANDMENT 4: *CHANGE WHAT THEY DO, NOT WHO THEY ARE*

Scores of management books discuss "teaching old dogs new tricks." Simply put, we often blame the person, their attitude, or their intentions, rather than their behavior. Three of those factors involve the person's identity; one does not. The first imperative in transforming behavior is to minimize the threat your request for change presents. Then concentrate your efforts on the action or result you want, not on the person providing it.

COMMANDMENT 5: *MODEL THE BEHAVIOR YOU DESIRE*

This is pretty self-explanatory. The key is not to send mixed signals. For example, a manager declared all meetings will begin on time – and then waits twelve minutes for stragglers to arrive. The unstated message is: "I'm not really serious about wanting you to be on time." To change is refreshingly simple. Stop enabling the behavior you are trying to change. Realize that everything you do and say is a signal.

Next time, we will cover the remaining Commandments for Change, and give you some great ideas for dealing with difficult people, whether it is the boss, the co-worker, or the guy in the I.T. Department!

George Nicholas operates George Nicholas Communications, specializing in technical and communication consulting throughout the US. You can contact him via Editor@radio-guide.com

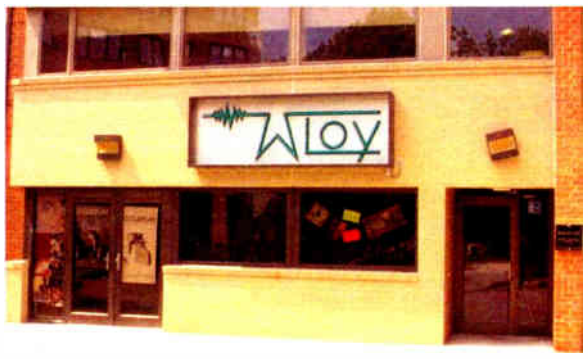
RADIO.EDU

"Our House is Still a Very, Very Fine House"

by John Devecka

[BALTIMORE, Maryland - September 2003] WLOY is a new station at Loyola College in Maryland, for the joint purpose of student classroom (mostly Communications Majors) and student club (you know: those slackers who get involved in that whole radio "thing"). The facility includes four main studios (On Air, Production, Recording A and B), three News desks, a Library and Engineering rooms.

This was a big project; in the last column we offered a tour of the main On Air studio and discussed the equipment and design decisions that led to its layout. This time, we will look at the rest of the house.



I'LL TAKE YOU THERE

Recording A and B were set up with identical small equipment racks and several microphone options. The intent was to make them functional for simple recording booths, interview rooms and full production suites for classes. Each rack is on wheels so we can run it into the hallway outside the room for larger performances and interviews. These studios can also be called up throughout the facility in case we need a quick substitute on air studio.

The Raxxess racks include an LPB Blue 5c on a tray (giving us broadcasting functions like muting and remote starting), Denon DN-T620CD/Cassette Combo units conserve space, Aphex 207s handle microphone preamp duties (again saving space with dual preamps in a 1RU chassis), while Hafler P1000 and LPB Spatial Ones handle listening duty. Microphones are a mix of Studio Projects B1 for basic operation and C1 and C3 for in-studio recordings.

Both Recording studios run iMac 17" units with ProTools LE software. A Digidesign MBox interface is in Recording A and their Digi002 console is in B. We have already managed some in-studio stuff that sounded pretty good. Besides my own fumbling, I have tried to make sure the students are involved in setting the microphones, tweaking levels and processing.

We went with Pro Tools for a lot of reasons, but they can be summed up by the experience of one of the students interviewing for a job. Q: "You know Pro Tools?" A: "Yes" Q: "When can you start?" It provides a great base for Audio, Video, Radio, Live Sound and other areas that students are interested in exploring. And, it has been great at helping Journalism students understand how to assemble the parts of a news story.

Production got a bit more extravagant, and will continue to expand. This is where students will be introduced to audio processing and multi-track recording, so it has a few more bells and whistles. Middle Atlantic supplied the basic two wing desk with monitor overbridges.

An LPB MX18 sits in the center connected to DAs, digital and analog patch bays, and a Digidesign Digi001 running ProTools LE on an outdated G3 Mac (on our "upgrade list"). Denon DN-720R Cassette and DN-C630 CD units and a Technics SL1200 MKII make up the standard analog input devices.

We also have some of that digital stuff (and our CD players swing both ways...). A Denon DP-DJ151 Digital turntable allows us to bring in the jazz collections of several faculty members (and my blues 78s) and clean them up for airplay.

A Denon dual tray CD Recorder, Sony MD Play/Recorder, Samsung DVD player, and the Digi001 all route through an MAudio DigiPatch. This lets us run full digital I/O with ProTools for bringing in outside material and passing it back cleanly. A great little box and very reasonably priced – if you have a bunch of S/PDIF or TOSLINK devices, I would highly recommend taking a look at them.

PRESSURE DROP

Then there is the audio processing: The Aphex Compellor, Dominator, Parametric EQ and Aural Exciter, join Roland's Voice Boss and PreSonus ACP22 in the rack. At the patch bay (a real plug-n-play unit), connections to the other studios appear, as well as extra I/O for the ProTools system. Audio distribution is a mix of Broadcast Devices UTA-200 and Kramer VM-1120 units.

Rolls handles headphone distribution (as in all studios) and we have a mix of Studio Projects B1, C1 and Groove Tubes microphones, on LPB Silent Booms. The plan is to expand the variety of microphones available to increase the flexibility of the space and (more importantly) use them for classroom discussions of microphone technology and technique.

Recording B is identical to A, but instead of an MBox, it uses a second desk with a new Digidesign Digi002 console for multi-track recording on a rolling table so it can be pulled into the hallway if we need the space for recording. It was great to see this all work when we had Jennie Stearns in the station (she is great!) with her husband for a pre-concert chat and strum.

The students set up four microphones and played with each channel live on the Digi002 to make the recording, while also feeding the live mix back into production where two other students ran the interview. They were thrilled with the result.

The News area was designed to be both a classroom space, and a news production area. Each desk runs Cool Edit Studio (4-track), JK Audio Innkeepers, Rane mixers and B1 microphones on Silent Booms. Each of the three can independently make and record phone interviews for later playback, with the first position able to go directly on air. Our student news staff has used these for a variety of quick phone interviews with local promoters and for research background. The end results have been great for both classes and on air programming.

The Library (Music Director's office) and the Engineering room have racks similar to the Recording rooms. This allows for listening, ripping and playback of music from almost any location in the station. As with all the other studio areas, these also route through Engineering so as to provide emergency backups.

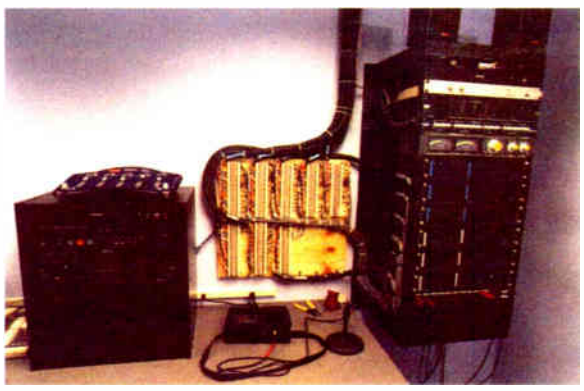
MAYOR OF SIMPLETON

Then there is the Engineering room. It was not supposed to be my office, but it ended up that way. Good thing I considered functionality in the design, eh? Now, where is that window when I need it?

All of the studios route through here. We have pulled the Audition and Program buses from every console back and into six Broadcast Devices UTA-200 DA racks, and right back out to every other studio. So, in theory, we can bring up anything anywhere, all the time

A patch bay allows us to monitor everything and a Dorrough 1200B Test Set helps check levels – until the students start fiddling. Kramer VM-3A tiny DAs help with odd routings and splitting for our external monitors (ceilings in lobby, vestibule, building entry) and transmission systems (CATV, AM, Internet). An important note: *Never* let a student set levels – no matter how good they are – without supervision. Just say "NO." Trust me.

Why all the DAs and not a Router? Well, besides the "all your eggs in one basket" fear, routers are darned pricey. With this setup, I have an easy visual reference for every studio (the plug-in cards for the UTA-200 all have level LEDs dancing for my amusement) and the ability to adjust every left/right level for every line. And, I have every studio routed to a punch block in every other studio all the time. Plus if I have a failure, which I did, it is usually going to be obvious (it was) and easy to swap out a card (it was) and be running again immediately.



Why the Broadcast Devices DAs over something less expensive? Two reasons, I can call Bob and yell at him if I have a problem (and more importantly, he *will* fix it), and the design of the cards allows way more flexibility than other DAs I have used. Over the years at LPB I used those cards for all kinds of things – standard DA, Headphone DA, Microphone Preamps, Headset interfaces, you name it. Bob was willing and able to make the cards do almost anything, and I liked that.

For areas that will not really need any tweaking, I used Kramer DAs. If you do not know about them, find some. I stumbled on them at NAB 2002 and have been very happy with them. They do audio and video stuff, are very sturdy and reasonably priced.

SAVE IT FOR LATER

Have I sufficiently described our studios at this point? I am happy to keep babbling, but I would rather just invite you to contact me if you want to stop over, or hear and see more. Next issue we will start talking about the transmission systems and computers. I should have five or six transmitters in place by then.

John Devecka is the Operations Manager of WLOY at Loyola College in Maryland, and former Sales Manager of LPB Communications. He has spent a silly amount of time working with odd situations and low budgets to make educational radio stations happen. He is still searching for people that get his humor. He is available at wloy@loyola.edu or 410-617-5349.

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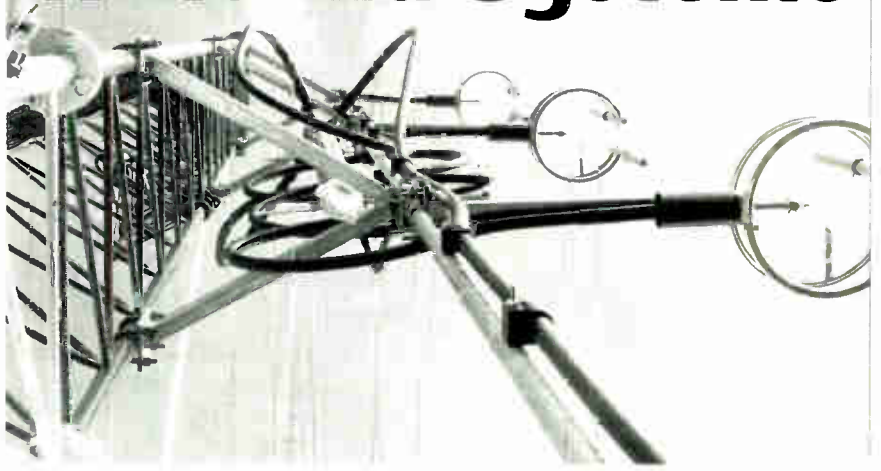

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Radio History

Radio Goes Mobile

WJAZ, The Zenith Station

by Harold Cones, PhD and John Bryant, FAIA

It was April 1925, WJAZ in Chicago had gained great fame as the communication link with Admiral Donald MacMillan's expedition to the Arctic Region. However, WJAZ's future was about to undergo change.

[NEWPORT NEWS, VA - September 2003] Eugene F. McDonald, Jr. enjoyed the recognition WJAZ achieved. The station, owned by the Zenith Radio Corporation and the Chicago Radio Laboratory, used its 600 watt transmitter to broadcast from the Edgewater Beach Hotel in Chicago to MacMillan's expedition.

Unfortunately WJAZ's signal also interfered with broadcast reception throughout the Chicago area. Due to complaints, the Edgewater Beach Hotel requested the station to decrease power. Seeking maximum range for the MacMillan expedition broadcasts – and maximum advertising potential – McDonald resisted. Nevertheless, he decided to close the station in April 1924, selling it to the Edgewater Beach Hotel's WEBH.

A 1924 Zenith press release explaining the demise of WJAZ stated, "…. Because of the uncontrollable interference caused by this station throughout the entire North Shore of Chicago, the company decided to erect a new station far enough away from the city and its environs so as to be no longer an interference to the three millions of people who make up the second largest city in the United States."

GOING MOBILE

When WJAZ announced it would be moving from the Edgewater Beach Hotel, Zenith was deluged with letters from the Chambers of Commerce of many of the small communities in the outlying districts of Chicago, some letters from two hundred miles away. It was initially decided to erect temporary broadcasting stations in all the towns selected for testing, a plan quickly abandoned as impractical and too costly. R.H.G. Mathews then conceived of a mobile broadcasting station that would not only allow site testing but would also allow live broadcasts directly from events and catastrophes in the greater Chicago area.

Zenith engineers quickly developed the idea into reality and on September 22, 1924, the mobile WJAZ demonstrated its ability for the radio inspector of the Ninth Radio District in Chicago. For the first time ever, the broadcasting station came to the inspector rather than the inspector coming to the station. The mobile station began testing locations on September 24, 1924.

The Zenith mobile unit, just returned from a cross-country Zenith promotional trip. Courtesy of Zenith.

Promotional materials and newspaper releases announcing the soon-to-arrive Zenith mobile station were sent ahead of its arrival. One promotional document provided the complete details of the mobile station:

We have in the Zenith Portable Broadcasting station, WJAZ, for the first time, a complete self-contained, self-sustaining battery operated broadcasting station, able to function entirely without any external sources of supply and carrying its own collapsible antenna mast and antenna. The station can be set up in the middle of a field without any other power supply than its own and without any supports other than its own antenna mast and operate indefinitely ..... The set is of 100 watt power and uses four 50 watt tubes, two as oscillators and two as modulators ..... the inductances, capacities and other apparatus is mounted behind these panels in a cabinet equipped with glass sides, allowing easy observation of the entire construction and interior of the set .....the antenna mast is of sectional type such as was used by the army during the war and is fifty-three feet in height ..... The antenna is extremely novel consisting of four heavily braided copper cables with extremely fine wire making them extraordinarily flexible. These wires are provided at each end with snap hooks which are attached to rings which fasten to two spreaders. The entire frame work and body of the truck, including the iron strips on the floor, are connected together and grounded, the grounding strips all being brought to one point at the side of the truck where a heavy connection lug is attached ..... Special armored cable is provided whereby the microphones can be placed as far as 300 feet from the truck, allowing the broadcasting of performances in halls etc., with the truck parked outside ..... The wave length is 268 meters. The call letters are WJAZ and the average radiation 4 amperes with an upward modulation of about 1 ampere ..... The entire wiring of the set is of the bus bar type, using gold plated copper bus bar ..... Three stages of push-pull amplification are used in the line amplifier and the output of this is connected to a five watt speech amplifier and from this connection is made to the two 50 watt modulator tubes ..... A novel feature of today's test inspection program, was that we signed off at 12:00 and at 12:10 the aerial was down, packed up, the truck closed up and under way, ten minutes only after operation was discontinued.

FROM MOBILE TO DUAL MODE

The mobile testing in early 1925 resulted in selecting Mt. Prospect, Illinois, a location 20 miles northwest of downtown Chicago as the new permanent transmitter facility for WJAZ. The studio was housed at the Chez Pierre nightclub (artist Pierre Nuyttens was one of McDonald's friends) until new studios were constructed on the entire twenty-third floor of the Strauss Building at 310 North Michigan Avenue.

The Strauss studio was state-of-the-art, employing acoustic material on the walls and ceilings rather than cloth drapes. An impressive reception room led through an archway into the main studio that was designed to resemble a garden, complete with stone benches and a large fountain containing Japanese goldfish. Tile floors, potted plants, an awning and dramatic lighting completed the decor.

The Mt. Prospect station figured prominently in another MacMillan Expedition, the 1925 National Geographic-MacMillan Arctic Expedition. This expedition was the first to fly heavier-than-air craft in the Arctic on mission, the first to use shortwave radio in the Arctic, and was Richard Byrd's first exposure to the Arctic (he was in command of the air wing). Zenith's McDonald was a major organizer of the expedition and served as second in command, and WJAZ in Mt. Prospect served as the receiving and relaying station for broadcasts from the Arctic.

Among the firsts relayed by the station was the sound of Eskimo song. McDonald had vowed before he left that he would treat the world to Eskimo songs, and he did on two occasions, one broadcast from Etah and one from Holsteinsborg. WJAZ also relayed press conferences during the four months of the expedition and served as McDonald's lifeline with his company.

With site selection complete, the mobile broadcast truck was relegated to promotional activities for Zenith. In January 1925, the truck was dispatched to Escanaba, Michigan, to engage in experimental broadcasts during a total eclipse. The station broadcast from January 20-24 with local programming when not engaged in eclipse experimentation. Commander McDonald flew to Escanaba from Chicago, landing on lake ice and staying in touch with WJAZ mobile by radio during the entire trip.

On the night of January 22, the 100 watt mobile WJAZ broadcast was received 2,000 miles away by the chief engineer at WMBF in Miami, Florida. The eclipse was obscured by clouds, but the radio experiments were successful, showing increased radio range for approximately an hour after the eclipse.

WJAZ mobile was licensed as WSAX to allow use of WJAZ for Zenith's new Mt. Prospect station, which began operation in late August 1925. It was from *this* WJAZ that Zenith's frequency jumping occurred in late January 1926 that led to court action and opened the radio spectrum.

On Friday night, February 5, 1926, WJAZ dressed its personnel as pirates to pose for promotional pictures and present the operetta "The Pirate." The intent was to bring public attention to the government suit against WJAZ for frequency jumping. WJAZ won the case and paved the way for logical government control of the broadcasting industry. Courtesy of Zenith.

MOBILE STATIONS GLORY ENDS

WSAX criss-crossed the country for a few months, making broadcasts from such exotic locations as Pike's Peak, where records were broadcast all night, and Gay's Lion Farm, where the live roar of a lion was first broadcast. WSAX also visited Jack Dempsey's training camp for a live broadcast. The mobile station stopped broadcasting prior to the August 1, 1928 withdrawal of licenses from all mobile broadcasters by the FRC. McDonald felt he had squeezed all the publicity from the unit that he could, and by then he had determined that broadcasting was not going to be Zenith's game.

Operation of WJAZ was assumed by Mathews, and as his interest declined, the station leased time to several politically oriented groups who used it to "largely combat communistic propaganda." These agreements were short-lived and WJAZ entered a period of irregular schedules and spotty programming. Eventually, the WJAZ license was withdrawn for lack of activity in November 1931 and some authors speculate the move was retaliatory on the part of the FCC for the problems caused by WJAZ in 1926.

Initiated primarily as a promotional tool and a means of communication with the Zenith-equipped MacMillan Arctic expedition, Zenith's WJAZ demonstrated the ability of Zenith-built early radio to succeed in long range communications. In future years, Zenith "Long Distance Radio" receivers had sales enhanced by these early endeavors.

The WJAZ mobile broadcast truck, which was not only the first of its kind, but was also far superior to its quick-to-emerge competitors carried the romance of Zenith radio country wide, even to very small towns. In all, the impact of WJAZ, both fixed and mobile, was reflected in enhanced Zenith sales and played a major role in the quick rise of Zenith Radio Corporation as a nationally recognized radio manufacturer.

Harold Cones is a Professor and Department Chairman at Christopher Newport University in Newport News, Virginia. Dr. Cones and his research partner, John H. Bryant, FAIA, Oklahoma State University, have been researching and writing on radio topics for 20 years. Their latest book: Zenith Radio, The Glory Years, 1936-1945 is in current release. More information is available at www.cnu.edu/bces/ConesHome.html

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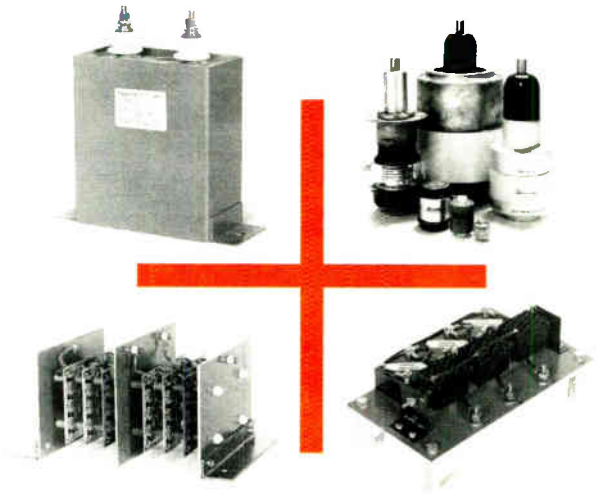

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Networking 1100110

The Next Step

by Tren P. Barnett

[TUCSON, Arizona - September 2003] Last night I donned my writing hat, keyboard in hand, ready to write about wireless networking. I finished my article, saved it to the server, and thought to myself, "life is good." I sent this article through the bits and bytes of technology to our fine editor, and along with the following article offered him a real bite also, that is a bite to eat. Technology at its finest, the news on the TV via satellite, an article to the editor via wireless.

Now most of you have already put 10 and 10 together and come up with 100, and as most have seen the article has been renamed Networking 1100110 – The Next Step. Well welcome to Networking 102, where we are going to discuss how the 1's and 0's sometimes just do not go on and off like they are supposed to and 10 + 10 does not always equal 100. Well 10 + 10 *(binary)* does equal 100 *(binary)* and 2 + 2 is equal to 4, until a one is lost. Yes: 10 + 00 equals 10, and the editor does not get the article. Well, who does? The answer sometimes may be "who knows?"

The same, unfortunately, is true outside the tiny little switches being used in our computers. Sometimes the product's name is more confusing than the real usage. That is why I wrote this article – and why I wrote this prelude to the article.

WIRELESS

Wireless networking the next wave of computer advancement. Advancement yes, painless, no. The other day, in appreciation for my hard work, the company I work for bought me a wireless Windows CE phone. It is a nice present, but it is also a tool. Now, not only can they call me when they need me, but I can immediately log onto on their network, and supposedly fix their problems.

Why? Because the CE phone I have can VPN into my network, and through Terminal Services running on Windows CE I can wreak network havoc. The screen is too small to do much major work, but you would be amazed at what you can do.

Wireless networks are everywhere, and yet, depending on what the device is, wireless can mean so many things. You can get high-speed network connectivity to the Internet through your dish network for TV. You can get wireless connectivity through your phone, or through a PCI card that ties into another type of Internet access, and of course there is wireless for the home in the WiFi world, just to mention a few.

TRYING TO IDENTIFY PROGRESS

That is where one of the problems comes in with new technology and the ever-changing computer world – so many terms that seem so static all of the sudden come to identify something new. For instance, a 2 MHz microprocessor was once considered outlandishly fast. But before long came 4 MHz, then 8 MHz, then ... 2 GHz, and it still has not stopped.

CPU chips have moved along through 8086, 80286, 80386, 80486, Pentium, and that list continues on. Additionally, other companies followed suit, with their Intel compatible chips. Some manufacturers began to realize numbers mean so much, and so little. What really is an Intel(r) Pentium(r) 4 Processor? Which is faster: 3.20 GHz, or 2.4 GHz? If I make a chip and stamp 2100 on it, what do you think its speed is? You might be surprised.

The same situation has come true in wireless networking; there are so many manufactures and so many answers, where do you start? Just from the home networking side of things there are Routers, Hubs, and Gateways; you can find these names stamped on all forms of wireless equipment and some kid in a store will sell it all to you because his boss or some magazine says you need it.

Yes, you can count on that Techno-Genius Wizard and Babble the Setup Assistant to secure the world for you by plugging just one wire, one cable, and a PCI card along with the CD into your computer. Then you will have "a lightning fast Cable/DSL Internet access with an integrated 24-port switch."

Furthermore, fear not – you are safe with the Super-Duper Firewall with VPN access which protects against Mega Hacker, the world's worst 18 year old. Also you can connect up to 1024 network users. Boy wouldn't they be screaming fast as they all share the 256k DSL connection. Not only that but kids may restrict and monitor their *parents* access to inappropriate links, as the parents will probably need them to set it up. You too will be blessed with instant alerts and regular e-mail notification of activity and updates available. Woo hoo! more spam.

Well I have said enough, I do not want to pick on a particular manufacturer, but what the heck *is* all of that? I know I need it – Joey at Computer Mania said so. The problem is, another manufacturer will create similar products and name them almost the same; but what are you getting, and what will it do for you?

PRACTICAL APPLICATION

A reader asks: "I want add a third computer to my home wired network, but do not want to run a wire upstairs. So I bought a couple of wireless routers that were on-sale recently. How do I connect all these together so each computer can access the same network shares, and use the Internet without problems?"

Depending on the manufacturer, you can do that several different ways, with several different solutions. That leads to just one question – no – wait! – two – no ... Yes, that is the problem: Which is best? What do I need? Which route should I go?

Personally, I am not a lazy man, but I still do not want undue burdens. In analyzing the situation, we need to decide if you need a Wireless Cable/DSL Router? Or do you need an Access point? Will your data be safe, or should you install a Mega Firewall? It is a hub, or two wireless routers that are needed?

The true answer lies in what you want to do. Most people can achieve everything they want by purchasing one wireless Cable/DSL router, and a few wireless network cards. Again though, what is a wireless Cable/DSL Router? The answer is, depending on the equipment it can very. But the bottom line is we need to do one thing in our scenario. Get the family on the Internet.

You may have already done that by slamming two network cards into one computer. It is possible to do connection sharing if your computer has two network cards. Or, scenario number two: You may have decided you would get yourself a Cable/DSL router. What do we need?

In scenario number one we are doing connection sharing. In the Microsoft world, that means we must stick pretty closely to some settings for addresses and gateways, using TCP/IP. But it works, and works well. Now there really is no firewall protection in this setup, but then again, is your computer that exciting? How often does your IP address on the Internet change? If you keep up on your patches and do not do any sharing on this computer are you safe? It is my opinion we need to change a few things.

A CHOICE OF SOLUTIONS

So, for scenario number one you are probably a candidate for a wireless Cable/DSL router with firewall protection. This overcomes several problems. First of all, connection sharing is not the most secure network. Secondly, it is not the fastest network. And finally, you cannot shut down the main computer and still work on the Internet. But if you get the wireless Cable/DSL router, it will do the following for you:

1. It will route, in the sense that it will take the one IP Address the ISP wants to give to you and it will provide DHCP address for all internal computers on the network.
2. With a little minor configuration, it will let you share between your computers, documents and printers.
3. It will close down most – if not all – unneeded TCP/IP ports and protect your computer on the Internet.
4. It will still allow you to VPN into the office.
5. Since it also has some ports, you can use the old network cards in your computers and not have to buy wireless for everyone.
6. It will also allow the wireless access for your need.

Scenario two: You already have a Cable/DSL router, however it just is not wireless. Perhaps an access point is more your style. That old Cable/DLS router is still protecting you, it is still handing out addresses, and it takes care of the existing computers just fine. If so, an access point or a wireless hub is really all you need.

1. The existing Cable/DSL router will provide the DHCP addresses, and firewall protection.
2. Since it also has some ports, you can use the old network cards in your computers and not have to buy wireless for everyone.
3. It will allow you to VPN into the office.
4. And now with the wireless hub you will have the wireless access you need.

In both cases, the wireless Cable/DSL router or the Cable/DSL router is a router by name and function. It works as a protective server, it firewalls us from the Internet, and gives us TCP/IP addresses allowing us access for many users to one point *(i.e. routing)*.

For many, the term router means "a connection to a connection." Many think a router must connect to another router. It uses routing tables and internal and external addresses. Thus routing requests from one location go to another through the routing process. My servers in Seattle connect to my servers in Butte via two routers that tie it all together.

It turns out a wireless Cable/DSL router does something similar, hence the name. But it does not need a second Cable/DSL router to connect the wireless world with the wired world. It routes in the sense that it sends the internal request of the home or office network out to the internet, and back in to the correct computers, protecting the world from Mega Hacker who, by the way, has now turned 19.

Tren Barnett is a System Administrator and Programmer in Tucson, Arizona. He welcomes your questions on solving network problems in your facility. Contact Tren at tpb@aires.org

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From the Transmitter Shack

The Transmitter From Somewhere Just Short of Heaven

by Don Kimberlin

[LANDIS, North Carolina - September 2003] The first episode in this series was about a much-loved and reliable FM transmitter that suffered an ignominious failure due to a bullet shot into its transmission line. This story is about the opposite condition: a miscreant machine that defied all attempts to make it reliable.

To be fair, we must note this 10kW AM transmitter was placed in a very poor situation. Located in an uncooled room in Southern Florida, its intake air temperature exceeded 100° Fahrenheit daily from shortly after sunrise until hours after sunset. Its antenna array was a real beast – the night array was five one-tenth (0.1) wavelength radiators spaced one-tenth of a wavelength apart.

One might have thought the site was ideal; it was a former Florida sod farm that grew a lush stand of Saint Augustine grass. Unfortunately, in that swampy, subtropical climate, Saint Augustine grass grows about a foot per week; it took only four inches of grass to drive this very tight array out of spec, and drive the nulls overlimit!

FULL TIME GARDENER

The situation demanded the station have an employee who, like a window washer on a skyscraper, rode a lawnmower around and around the acres of grass, trying to keep it short. I say "trying," because the parsimonious station owner had sent a Farmall Cub tractor down from Maryland for the mowing. I soon learned Farmall Cubs were not sold south of Virginia because they delivered only 7-1/2 horsepower. It made them an economical favorite for northern golf course mowing, but totally insufficient for the coarse, tough southern grasses. That Cub twisted off shafts, broke gears and even split transmission cases regularly, to the point that, truth be known, the station had a *lot* of inaccurate monitoring point readings in its logs!

What makes the mowing issue worthy of mention was the day the partially-sun-blinded mower operator hooked and drove a front wheel of the mower up a guy wire on the tower immediately adjacent to the building. From inside the building, we heard, then watched, both the AM and FM transmitters cycle crazily, followed by a clock-spring-like sound similar to the one heard in Hollywood cartoon movies when the cat gets inside the grandfather clock and sends it crashing down on the floor.

The difference was that this spring sound was the loudest you might conceive – probably what the spring sounded like to the cat inside the clock! I ran outside to see the tower still wobbling crazily between its guy points and the mower operator picking himself up. The Cub was lying on its side, engine still running, pumping its crankcase oil out on the ground. We merely tipped the mower back up again, topped up its crankcase and started back to work. Such an incident became rather routine in this Broadcasting House of Horrors.

OVERLOAD?

This AM transmitter had a peculiar sort of "advanced" overload cycling system. Unless the overload was so huge as to trip a circuit breaker, this transmitter would cycle its AC primary to the plate transformer repeatedly – hundreds, perhaps thousands of times until a human intervened and stopped it – or cleared the condition. In time, the contacts of the plate AC contactor welded themselves shut with no indication to anyone. It only came to light the night our signoff combo man tried to shut it down.

Can you imagine what a bank of mercury vapor rectifier tubes with their filaments shut off, but their high voltage left on sounds like? It is a huge arc welder sound! I first heard it when my home phone rang, and a screaming voice that sounded female in its fright shouted "The transmitter is trying to destroy itself!" followed by the phone dropping to the floor, and a giant humming/buzzing sound.

By the time I got to the station's long driveway, it was an eerie scene. The entire property was in darkness, building and tower lights. Nobody was there. The place was abandoned

Feeling my way inside to the desk drawer where I kept the absolute backup flashlight, I saw in the gloom the bloody streaks of fingerprints where the combo man had clawed an air return grille off the locked spare parts closet. That happened to be where the AC power circuit breakers were, probably in violation of power codes even all those years ago.

When I flipped the AC main breaker back on, the frighteningly huge arc-welder sound began in the transmitter room. I flipped the breaker off again, and located the AM transmitter breaker, so I could get the building and tower lights back on.

Then I went over to the cold, dead AM transmitter and looked for anything externally obvious. Nothing showed. Deciding so much damage must have been done that no more would matter, I went back and turned on the AM transmitter main breaker, dashing out front to see what the huge humming/buzzing sound was. There were six bright, white arcs inside the mercury vapor rectifier tubes – but no filaments, no blowers, nothing else!

I dashed back and re-opened the transmitter breaker. Then I took a cover off to look at the AC plate contactor, and could see it was hung up closed on its burnt contacts. It only took one swat with a hammer to knock it loose. I dressed the contacts with some emery cloth as best I could, and looking upward to Heaven for support, tried starting the transmitter.

Amazingly, it started up! Even the rectifier tubes did not explode as I feared they might. After a few minutes of making sure it functioned properly, I shut the Transmitter From Hell down and went back home to bed. As best I recall, that combo man never returned even to collect his final paycheck, and was last heard of working as a sales clerk in a bookstore.

MORE ARC WELDING

Being in southern Florida, we had a Florida-style share of lightning hits. This particular transmitter took its Florida share of them, which resulted in two sorts of common failures. One was caused by the rather low-temperature plastic insulated wire tied up in neat, tidy bundles going around the inside corners of the cabinets. From time to time, some stray current would arc over inside a bundle, and in addition to whatever damage might ensue – perhaps from a 240 VAC control line coming in contact with an audio wire – there would often be a nice little smoldering flame at the site. That really helped us to restore the operation rapidly, as we would simply douse the flame, cut the cable ties and pull the bundle open at that point. The transmitter actually ran fairly well with all those cut-open spots in its wire bundles.

Meanwhile, the 3CX500F3 triode power tubes sat on rectangular aluminum air plenum boxes with blowers underneath, insulated by some inch-thick bakelite plates with large holes for the tubes. When lightning got real nasty and got inside the AM transmitter, it would often arc over from the finned body of the tubes to the mounting screws through the bakelite at the edges of the plenums. Eventually when there were enough arcs to burn a carbon track in the bakelite, the transmitter high voltage would sustain the arc with a concomitant nice arcing sound of its own, to which the transmitter's weird overload control would add a "huckle-buck" of power-off/power-on, not stopping until someone intervened.

To handle this little routine matter, we kept an old-fashioned beer can "tapper" (remember those things used to punch a triangular hole in the top of beer cans?) on a string hanging inside the power tube compartment. We would shut the transmitter down, jump inside to rake a nice, clean, carbonless groove in the bakelite and slam the transmitter back on the air.

A DEFINITE LACK OF COOPERATION

But the *piece de resistance* – the stunt that really capped it all for the Transmitter From Hell – was the day it virtually defied getting fixed for a solid twelve hours; I was one mortified chief engineer that day. The transmitter lost its RF drive around 9:00 AM, and just sat there doing nothing, although with all voltages applied. The indication was no RF drive to the PA, but normal plate current on the RF driver stage. The RF PA of course, biased itself into non-conduction, thus its plate current was zero. Since this particular model had no alarm for loss of RF drive, there was just a stony, rather eerie silence other than its blower motors.

We were utterly perplexed, with no tools or spare parts, aside from a few screwdrivers and an old DC volt-ohm-milliammeter. We poked, probed, tightened, cleaned and did everything we could think of, but nothing corrected whatever the problem was.

After many hours, in desperation, I called the FCC District Engineer, who happened to be in a nearby town. This fellow was a great deal like a classic Irish traffic cop who would help anyone peaceable on his beat. In addition, the man was a crackerjack engineer in his own right.

He had no tools with him other than a grid dip meter, which allowed us to verify the RF driver was tuned to the proper frequency. We decided the only thing left was the actual connection between the RF driver and the PA. It was a few feet of small-diameter coaxial cable, run and tied inside one of those wire bundles which had been so much trouble.

We cut it out of the bundle, de-soldered it, and check it with our ohmmeter. Sure enough, the coax had cold-flowed to a short circuit right where it went around a corner inside the cabinet! Whatever its capacitance per foot was, that piece of cable and its short made a fine resonant sink for the entire output of the RF driver!

The fix seemed to be easy, but turned out to be *not* so easy. The coax looked like it was garden-variety stuff. But when we replaced it with some scrap we had on hand, the capacitance of that coax turned out to be an integral part of the resonant circuit, and we could not get the RF driver to tune up enough to get the RF drive we needed!

Looking closer, we noticed the failed coax was RG-62/U, which had only military use in that day and age; there was none to be found in our town. We tried making up a piece of open-air bus wire to connect the RF driver to the PA grid, but to no tunable avail. I finally tried using the piece of defective RG-62, cutting it open where it had been formed around the cabinet corner and visibly squeezed with a tie, so it had only a couple of inches of space. That actually worked and we finally got back on the air, with nearly normal RF drive.

There are many other stores about The Transmitter From Hell, but suffice it to say it was the plant that got me looking about until I found a job open at the AT&T Long Lines HF radio plant nearby!

Don Kimberlin is a NARTE Certified Engineer, based in Landis, NC. He has written on many technical topics, both current and historical, and loves to go hunting for history. You can reach him at donkimberlin@earthlink.net

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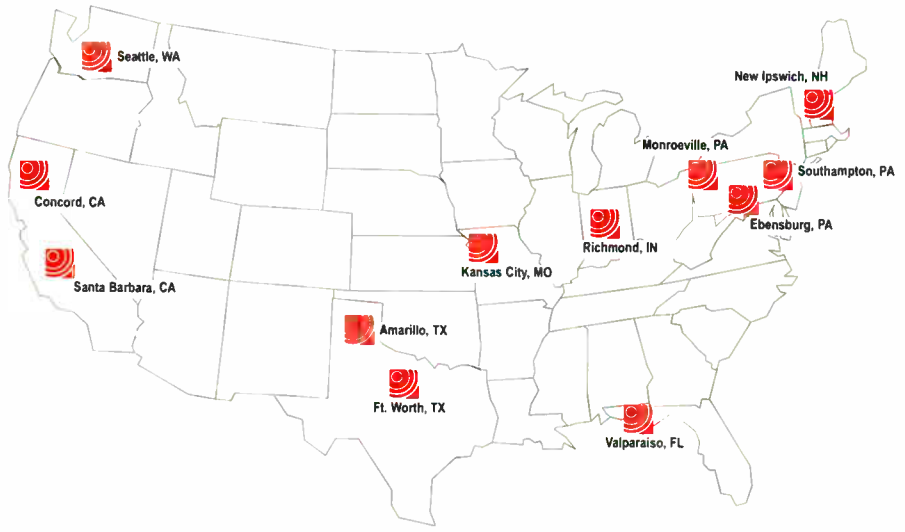

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FM Transmitters	2.5 kW	1978	Collins 831D2
	3.0 kW	1996	QEI Quantum
	3.5 kW	1985	BE FM 3.5A
	5 kW	1982	Harris FM5K
	10 kW	1980	Harris FM 10K
	10 kW	1991	QEI FMQ10,000B
	20 kW	1977	Harris FM20K
	20 kW	1982	Harris FM20K
	20 IW	1989	QEI FMQ20,000B
	25 kW	1997	CCA - Single Phase
	25 kW	1980	CSI T-25-FA *(amplifier only)*
	30 kW	1984	BE FM-30
	40 kW	1978	2-RCA BTF-20E1 *(combined)*
	50 kW	1982	Harris Combiner*(w/auto exciter-transmitter switcher)*

Misc Equipment

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Continental 802B Exciter
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Inovonics Model 250-01AM stereo processor
Potomac AM1901 Digital Phase Monitor
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Kintronics RFC8-1, 50kW AM RF switch

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FCC Focus

NOV: The Dreaded Letter From The FCC

by Ken Benner, NCE

[TUCSON, Arizona - September 2003] Several Radio Guide readers have e-mailed us recently, stating they have never been visited by an official FCC inspector – or possibly had one stop by fifteen or twenty years ago during which no violations were found - and thus they have nothing to worry about.

While it is rare to have an official visit from the FCC, it can be a rather disturbing experience especially if concern for regulatory compliance has been a bit lax. Furthermore, nowadays it can be both disturbing and embarrassing since the FCC has started placing NOVs (Notices of Violations) on its website.

Our kindly Editor has agreed that sharing an actual recent NOV with you would be informative and helpful, so here goes, with apologies to our good friends in Texas (the station inspected was *not* in Texas) – only the identifying names, numbers, locations and dates have been changed to protect the guilty. Any similarity to any persons, places or stations living or dead, is purely coincidental and without intent, although it should be noted that most of the items found non-compliant in this actual official FCC inspection NOV are typical of those items we find in the Alternative Inspection Program.

– The Dreaded NOV –

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of::

Holy Smoke Broadcasting, Inc.
Purdyville, Texas

AM Broadcasting Services
Callsign ABCD
Community of License Purdyville, Tx.
Facility ID 00000

File Number EB-88-AN-4566
Via Certified Mail #:1234 5678 9012 3456
Return Receipt Requested

NOTICE OF VIOLATION
Released: December 25, 2002

By the Enforcement Bureau, Uglyville, TX
Resident Agent Office:

1. This is a Notice of Violation ("NOV") issued pursuant to Section 1.89 of the Commission's Rules ("the Rules"), 47 C.F.R. § 1.89, to Holy Smoke Broadcasting, Inc., Purdyville, Tx. ("HSB"), the Licensee of AM Broadcast Station ABCD[1], operating in the community of Purdyville, Texas, for failure to comply with various Parts of 11 and 73 of the Rules, 47 C.F.R. §§ 11 & 73 as outlined below.

2. On December 25, 2002, agents Gustav Von Kleppen and Ole Svendson of the Commission's Enforcement Bureau's Uglyville Resident Agent Office inspected AM Broadcast Station ABCD at the main studio and transmitter location, 12345 Radio Drive, Purdyville, Texas. HSB holds an authorization to operate AM Broadcast Station ABCD, 1230 kHz at 50 kW. At the time of this inspection, the agents found the following discrepancies and violations of the Rules:

a. The instrument of authorization or station license(s) were not posted conspicuously nor were they located in a binder or readily available. Sections 73.1230(a) and (b), 47 C.F.R. §§ 73.1230(a) and (b) states, in part, that the station license and any other instrument of authorization shall be posted in such a manner that all terms are visible near the location the licensee considers the principle control point (posting location). Additionally posting is considered to be either fixing these required items to the wall at the posting location or alternately in a binder or folder so that the documents are readily and easily accessible in either of the chosen methods.

b. The EAS log entries and printouts, inspected and dated, between Monday November 23 and Thursday December 20, 2002, indicate that the Required Weekly Test failed to be received from monitoring source #3 during the weeks of November 23-30, December 1-7 and December 14-21, 2002. Agents could not locate the appropriate entries in the broadcast stations logs determining why the required tests were not received. Section 11.35(a) of the Rules, 47 C.F.R. § 11.35(a) states, in part, that the EAS equipment must be operational and that broadcast stations must determine any failure to receive the required tests or activations specified in §§ 11.61(a)(1) and (2). Appropriate entries must be made in the broadcast station log as specified (§§ 73.1820 and 73.1840) indicating reasons why any tests were not received.

c. The EAS log entries and printouts, inspected and dated, between Monday November 23 and Thursday December 20, 2002, indicate that the Required Weekly Test failed to be originated (sent) during the weeks of November 23- 30 and December 1-7. Agents could not locate the appropriate entries in the broadcast station logs determining why the required tests were not sent. Section 11.35(a) of the Rules, 47 C.F.R. § 11.35(a) states, in part, that the EAS equipment must be operational and that broadcast stations must determine any failure to receive the required tests or activations specified in §§ 11.61(a)(1) &(2). Appropriate entries must be made in the broadcast station log as specified (§§ 73.1820 and 73.1840) indicating reasons why any tests were not originated.

d. Station ABCD is authorized unlimited hours of operation per the terms of the station authorization and is providing programming 24 hours per day, however the agents were advised that the stations control point does not have a human presence the full 24 hours. Additionally, the agents were advised that the station EAS equipment is being operated in the manual interrupt mode and therefore cannot provide the required capabilities at times when no staff is present on site to oversee the system. The integrity of the EAS system, in the case of a national EAS alert, requiring retransmission immediately upon receipt, or the Required Monthly Test, requiring retransmission within 60 minutes[2] of receipt, is compromised. Section 11.35(a) of the Rules C.F.R. § 11.35(a) states, in part, that licensees are responsible for ensuring that EAS equipment be operational so that the monitoring and transmitting functions are available during all times the station and systems are operational. See also § 11.51(k)(2) for authorization to use; §§ 11.51(k)(2) and 11.52(e)(2) for EAS messaging time requirements (see footnote 2) and §§ 11.51(i) & (m) and 11.52(b) for EAS equipment placement/location requirements under manual interrupt.

e. The EAS log entries and printouts, inspected and dated, between Monday May 8 and Friday June 3, indicate that the Required Weekly Test when originated (sent) by ABCD are being issued for the Purdyville-Major Metro, TX, operational area when the community (city) of license and EAS operational area for ABCD is Purdyville, Texas. Section 11.51(k) of the Rules, 47 C.F.R. § 11.51(k) states, in part, that when a Required Weekly Test is originated it must include (emphasis added) the location codes for the State and counties in its service area. Furthermore, § 11.51(k) states that other location codes may be included (emphasis added) upon approval of station management.

f. The station EAS equipment is monitoring a non-authorized source for the operational area. The stations receiver #2 source was tuned to and monitoring FM station EFGH (87.9 MHz), in Lonelyville, Texas. This station is not among the listed stations in the State of Texas's EAS Plan monitoring assignments. Section 11.52(d) of the Rules, 47 C.F.R. § 11.52(d) states, in part, stations must monitor two EAS sources and that these sources are specified in the State EAS Plan and FCC Mapbook.

g. The EAS log entries and printouts, inspected and dates, between Sunday April 6 and Saturday May 3, 2002, indicated that the Required Weekly Test was not originated (sent) during the weeks of April 13-19 and April 20-26. Section 11.61(a)(2)(i)(A) of the Rules, 47 C.F.R. states, in part, that FM stations must conduct tests of the EAS header and EOM codes at least once a week at random days and times (emphasis added).

h. The EAS log entries and printouts, inspected and dated, between Sunday April 7 and Saturday May 3, 2002, had not been signed by the person posting the entry into the log. Section 73.1800(a) of the Rules, 47C.F.R. § 73.1800(a) states, in part, that any employee making a log entry shall sign (emphasis added) the station log, thereby attesting to the fact that the entry, or correction or addition made thereto, is an accurate representation of what transpired.

i. The Chief Operator designated in writing and posted, as required, is not the same person on staff that has assumed and is functioning in the capacity of the chief operator, or has been appropriately designated as an alternate. Section 73.1350(b) of the Rules, 47 C.F.R. § 73.1350(b) states, in part, that the licensee must designate a chief operator in accordance with § 73.1870. The licensee may designate one or more technically competent persons to adjust the transmitter operating parameters for compliance with the technical rules and the station authorization.

j. The Chief Operator designated in writing and posted, as required, is not performing the duties as required. Section 73.1870(c) of the Rules, 47 C.F.R. § 73.1870(c) states in part, that the chief operator is responsible for completion of the duties specified in the rest of this paragraph, §§ 73. 1870(c)(1) through (4), as may be applicable to the stations type of service.

k. The transmitter power output ("TPO") was at or near 109.6% of the authorized power of 50,000 watts, based on the direct method of measurement. Using the base impedance of 137 ohms, as indicated on the Station Authorization, a reading of 20.0 Amps was observed, indicating a power output of approximately 54,800 watts or 109.6% relative to the licensed value of 50,000. Section 73.51(a) (1) and (2) of the Rules, 47 C.F.R., states, in part that stations operating in the AM Broadcast Service must be maintained as near as practicable to the authorized transmitter output power and may not be less than 90% nor more than 105% of the authorized power.

l. No documentation is available that equipment calibration, monitoring procedures and/or schedules to ensure compliance, was taking place. The transmitter's PA plate current and output meters were inoperative and the remote control system is reporting monitored stages in error. Sections 73.1350(a), 73.1350(c)(1) and (2), 47 C.F.R., state in part that each licensee is responsible for maintaining and operating its station in a manner which

(Continued on page 22)

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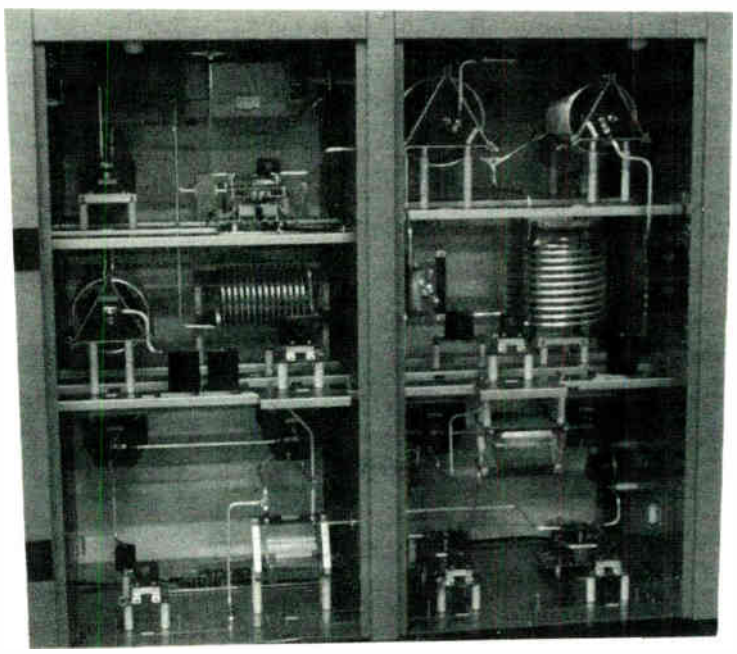

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FCC Focus

Continued from page 20.

complies with the technical rules in this part and in accordance with the terms of the station authorization. Furthermore, the licensee must establish monitoring procedures and schedules for the station, specifically insuring the meters comply with §73.1215, and that the monitoring equipment be periodically calibrated so as to provide reliable indications of transmitter operating parameters with a known degree of accuracy. Per § 73.1820 these data become part of the station logs/ records.

m. The Public Inspection File was not maintained as an independent and station specific file separated from other co-located/co-owned stations Public Inspection Files at this studio. Section 73.3526(a)(2) of the Rules, 47 C.F.R., states, in part, that a separate file shall be maintained for each station for which an authorization is outstanding, and the file shall be maintained so long as an authorization to operate the station is outstanding.

n. The Public Inspection File did not contain a copy of the station contour map. Section 73.3526(e)(4) of the Rules, 47 C.F.R. states, in part, that a copy of any service contour maps, submitted with any application tendered for filing with the FCC, together with any information in the application showing service contours and/or main studio and transmitter location. These documents shall be retained for as long as they reflect current, accurate information regarding the station.

o. The Public Inspection File did not contain the radio issues/program lists for the proceeding calender quarter, January through March 2002. Additionally, none of the 2001 calendar year lists could be located. Section 73.3526(e)(12) of the Rules 47 C.F.R., states in part, that the list for each calendar quarter be filed (in the public inspection file) by the (10th) day of the succeeding calendar quarter (e.g. January 10 for the October-December quarter, etc.) The list is to include a brief narrative of what issues were given significant treatment and the programming that provided this treatment. The description of the programs shall include, but shall not be limited to, the time, date, duration, and title of each program in which the issue was treated.

3. As the licensee of this station, Holy Smoke Broadcasting, Inc. is responsible for all matters relating to this license, and is expected to know and comply with the Commission's rules. Failure to remedy the noted violations and comply with the requirements of the Rules cited may result in the imposition of a monetary forfeiture, pursuant to 47 C.F.R § 1.80, or other administrative sanctions.

4. Accordingly, IT IS ORDERED, pursuant to Section 1.89 of the Rules, 47 C.F.R. § 1.89 that Holy Smoke Broadcasting, Inc. shall within 15 days of the Released date indicated above submit a written statement concerning this matter to the following address:

Federal Communication Commission
Enforcement Bureau
Uglyville Resident Agent Office
P.O. Box 1234567
Uglyville, TX 00000-0000

The written response shall contain a statement of: a) the specific action(s) taken to correct the violation(s); b) the specific action(s) that are being taken/implemented to preclude their recurrence; and c) if/as required a time line for completion of a and b of this paragraph. The response shall be signed and dated. All replies and documentation MUST INCLUDE the File Number indicated above.

5. Failure to respond to a NOV constitutes a violation of the Rules, 47 C.F.R. §1.89 and could incur additional administrative penalties. Any false statement made knowingly and willfully in reply to this NOV is punishable by fine or imprisonment under Title 18 of the U.S. Code, 18 U.S.C. § 1001 et seq.

6. IT IS FURTHER ORDERED that a copy of this Notice of Violation shall be send by certified mail, return receipt requested to Holy Smoke Broadcasting, Inc, 12345 Radio Drive, Purdyville, TX 00000
Federal Communications Commission

Signature
Gustov Von Kleppen, Resident Agent
CC: Holy Smoke Broadcasting, Inc.,
Corporate Headquarters
Penthouse Suite - Ultra-Swank-Suite Building
Dallas, Texas 00000

[1] At the time of the inspection, the station callsign/ letters were XXYX and subsequently has changed to ABCD. Since the licensee information remains the same we use the new call sign in this document.

[2] The Required Weekly Test retransmissions time was increased from 15 minutes; 16 FR 18502, May 16, 2002 (FCC Report and Order, FCC 02-64, released February 26, 2002)

The preceding was taken word for word from an actual FCC Notice of Violation with all names of persons, calls, corporations, dates, places and zip codes carefully changed. Fortunately the station involved promptly addressed each of the citations and as a result did not incur a fine.

The items described in this NOV are very basic and are covered within the Alternative Inspection Program which the author and his colleagues are conducting for several State Broadcaster Associations.

Ken Benner, a retired broadcast engineer, resides in Tucson, Arizona. Showing his brains, he has been spending the summer roaming around the very far north again performing inspections under the Alaska Broadcasters Association program. Ken can be reached at bennerassociates@aol.com.

Tech Notes

CAM-D™

The Digital Answer for AM?

[TUCSON, Arizona - September 2003] 2003 has been the year for IBOC digital broadcasting. Or, has it? Testing has been going on for over a year now. Manufacturers are turning out increasing quantities of digital broadcast gear. More than a few FM stations are running IBOC full-time, and some AM stations have been using it during daytime. iBiquity recently released a new codec (SBR) to attempt to overcome some of the problems uncovered over the past year; several members of the NRSC call it a major improvement.

Nevertheless, there are still a large number of broadcasters who remain unconvinced the iBiquity™ system is the complete answer, especially for AM radio. And leading the pack of doubters is a scientist and inventor with enough credentials to deserve due consideration.

His name is well known – synonymous with innovation in the broadcast field for over 50 years. Symmetra-Peak™, independent sideband AM Stereo, and POWER-Side™ are just a few of the well-known names that broadcast engineers have used to improve their stations' transmissions over the years. In the course of his work, he has accumulated many patents in his name both in and out of broadcasting.

Of course, we are talking about Leonard Kahn. The head of Kahn Communications, Inc. is getting ready to unleash CAM-D™ or Compatible AM - Digital broadcasting. According to Kahn, his system is the only viable answer because iBiquity's digital AM system is "not a workable system," something he has been saying for some time. The problem, according to Kahn, is the "interference" generated on the sidebands as far away as the fourth adjacency. Even in daytime, high-powered adjacent stations can affect each other as far away as a thousand miles.

At night, the situation is worse. Referring to his work years ago with VOA on anti-jamming techniques, Kahn called the iBiquity system "better than the Cubans and the Russians ever did on jamming" in affecting co-channel and adjacent channel stations. (Regular nighttime operation with the iBiquity system has not yet been approved, but previous tests have brought howls from engineers and other listeners, unhappy with what they call a "buzz-saw effect" spewing interference all over the map.)

CAM-D

In contrast, Kahn says his CAM-D system will meet the FCC specification of 15 kHz fidelity and still stay within +/- 10 kHz bandwidth, reducing interference among stations. Describing a compatible system that will provide digital audio, but also preserve AM coverage, especially during emergencies as "essential," he pointed to the recent power blackouts in the NE and Washington, DC. Kahn noted "AM never was more important," as people were able to get information from battery operated radios.

Although he is unable to provide all the technical details, citing pending actions at the FCC and US Patent Office, he did explain the core technology was an outgrowth of the Kahn AM Stereo technology and the POWER-Side technology. This combination will allow an 8 kHz stereo signal on analog radios in the event a radio needs to drop back from digital due to signal strength. Riding on top of the analog audio is the digital information, with 15 kHz fidelity.

Another issue where CAM-D is supposed to improve upon the existing systems is the reduced delay that is induced into the program chain. Instead of a six to eight second delay, to buffer radios against loss of digital "lock," CAM-D is designed to operate with only about 200 milliseconds of delay. Kahn said he realized the importance of keeping the delay short when he considered fans at sporting events, or those who might watch a televised game, but listen to their local announcers on the radio. A longer delay would put those listeners "out of sync" with the game action, confusing them. With "a great chunk of AM listening" coming at such sporting events, or at times of breaking news events, the ability to operate on a short delay would enhance programming for listeners.

RECEIVERS

While facing the same need as the other systems to convince receiver manufacturers to include decoders for CAM-D in their radios, another benefit of CAM-D appears to be that "it is fully compatibility with the more than half a billion radios" already in the hands of the public. As soon as the exciters are installed and operating, AM Stereo can be heard right away either with one of the AM Stereo receivers (Sony SRF-A100, for example) produced since in the mid 1980s or by the "original" method of placing two radios side by side and tuning the sidebands.

Delivery of the CAM-D exciters is planned before the end of 2003, but an exact date is not yet available. Kahn's goal is to "build it right, with no corner cutting." Costs of the exciter also are not yet available, but are to be royalty free to broadcasters, with the long term money coming from receiver sales. Future features planned for CAM-D include digital data for displaying information on properly equipped receivers.

Will CAM-D be a viable alternative to the iBiquity system for AM broadcasting? Those who remember the hassles and regulatory indecision that doomed AM Stereo in the 1980s hope the FCC will take a strong hand to shepherd the testing and improvement of the AM band with the best possible system. Leonard Kahn is staking his long career and reputation on the proposition that, as many times in the past, he has the better mousetrap to keep AM radio vital for a long time to come. – *Radio Guide* –

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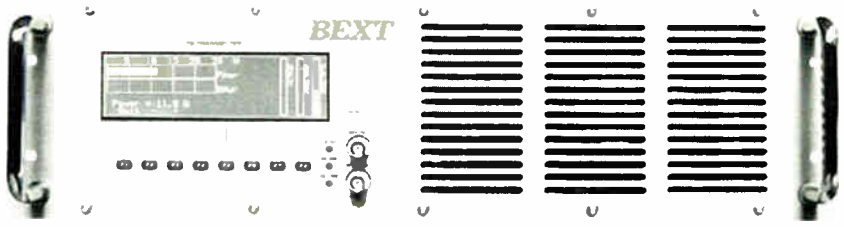

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Tech Topics

Careful Documentation is Invaluable

by George Whitaker

[ARLINGTON, Texas - September 2003] A few years ago, an engineer at a station near Austin was electrocuted while working on a transmitter. I did as complete an investigation of the accident as possible and wrote an article about my findings. However, it was impossible to completely reconstruct the exact sequence of events because of things other people did or failed to do. Proper documentation would have helped immensely in understanding what happened.

THE ACCIDENT

The transmitter where the accident happened was co-located with the studio; a disc jockey was within a few feet of where the man was working. The engineer in question was attempting to field repair a switchmod card in a Continental transmitter. He had been checking various readings on it over a period of a couple of hours (the station was on a full-power backup and speed of repair was not a real issue). Then he got a phone call and left the room for several minutes.

Seconds after he returned there was an arc sound and the man turned to the disc jockey and said, "Help me!" Then he fell to the floor. The announcer was facing the opposite direction until the sound of the arc, so there was no eyewitness to the actual event.

We can pinpoint several errors that lead to the engineer's fatal mistake. First, field repair of a switchmod card is contrary to Continental's published recommendation. He also violated the "hand in back pocket" rule as he had one hand on the cabinet while probing with the other. Still another error was violating what I call the "Stand A While" rule. This means if you are distracted, do not do anything until you have stood and looked at the project long enough to get your mind back into it.

POST MORTUM

The question arises: "What if the announcer had known CPR?" Could the outcome have been different? Possibly. That no life-saving measures were applied within a reasonable time period certainly did not bode well for the victim. However, while investigating the accident, I interviewed a doctor with extensive study in electrical shock cases. Without having examined the victim, he could only make an educated guess, but said the amount of voltage and the apparent path of the energy through the body would leave grave doubt as to whether resuscitation would have been possible.

In addition to my research, there were at least two government agencies, an attorney, and a private investigator attempting to reconstruct the accident. We were all thwarted by the actions taken following the incident and no real conclusion was possible.

FAILURE TO DOCUMENT

Critical mistakes were made in the aftermath. First, all meters and test equipment had been removed and no one noted what instruments were actually present at the time of the accident. This leaves the very important question "Did he stick his bare hand in to move something, or did a probe break down?" The voltage and current present on a switchmod card could easily penetrate a faulty probe, or possibly even a good one, if it were not designed for that type voltage. An examination of the probes was definitely called for, but they were no longer available for inspection.

Then the owners called in a TV engineer from one of their sister stations to finish the repairs on the transmitter with a swap-out switchmod card. When interviewed about two weeks after the incident, he was unable to provide even the slightest bit of information about the condition of the transmitter when he first encountered it. Continental field service had apparently talked him through step-by-step to get the transmitter back on the air and he had no idea what he had done, or why. His failure to document his actions frustrated the efforts of all the investigators.

THE RIGHT WAY

This engineer should have done the following prior to touching the transmitter:

1. Note whether there were any tools or other objects inside the transmitter. Debris might indicate something was used to defeat an interlock and the item used failed, allowing the interlock to close.
2. Carefully documented which interlocks were defeated and what method was utilized to accomplish this.
3. Documented which doors were open or removed.
4. Documented if any shields or other protective devices had been removed or defeated.
5. Produced a photographic record if something really appeared amiss.

Remember, almost every calamity – whether it be fire, flood, tornado, or accident – will need to be investigated. It could be insurance, OSHA, arson investigators, or any number of other agencies. And this is vitally true in a case involving a fatality. With all the stupid lawsuits today, you may be giving some lawyer an opportunity to steal another million by just speculating about what happened. Or, you might foil the "crooks" by producing proper evidence.

Especially on contract jobs it behooves you to protect yourself in the event someone questions the course of action you take following a calamity. Armchair quarterbacking can make a villain out of a hero if you do not have all the circumstances of the moment. An owner once accused me of a costly mistake. After showing him the facts, he said "Given the same information, I would have done the same thing you did." All unpleasantness was immediately resolved just by having the facts at hand.

George Whitaker has written on technical operations for many years. He is based in TX, and can be reached at gw@mikeflags.com

A Report on SBE Activities and Programs

SBE National View

Keeping Up With Broadcast Engineering

by David Hultsman – SBE Board Member

[BIRMINGHAM, Alabama - May 2003] A constant refrain from station owners all over the country is that they can not find qualified or experienced broadcast engineers. The pressures placed on many engineers today has caused many to leave the industry. Many of us clearly see the problem as we watch more and more qualified people leaving the industry. Experienced engineers often can make as much or more money in the computer industry, (especially in networking or two-way radio. And, they have the advantage of not having to deal with being on call 24/7 for six or seven stations, dealing with part time DJs, or the dangers in dealing with HV all by themselves.

On the other hand, broadcast engineering is almost like a virus. There are few jobs with the breadth of opportunities and experiences as found in radio and TV. From electronic skills, the broadcast engineer's day can quickly move through computer technology, studio construction, tower maintenance, transmitter repair, processor adjustments, reams of logs and other paperwork, plumbing, and much more.

I also hear from young engineers, saying they have accepted the position as staff or Chief Engineer and will readily admit that they are still learning. Well, to that I say, "Aren't we all in a position of continuous learning?"

I can honestly say that while my first job at a radio station was very exciting, I really was somewhat frightened due to my worry and concern about the complex equipment used between the microphone and the antenna of an AM radio station. Much of my initial work involved the handling of production dubbing to both ET's and, later, cartridge machines.

Of course, as the new kid on the block, all the cleaning chores were assigned to me. I quickly learned about how moving parts collect dirt, and the way tape oxides clogged tape heads and got all over the rollers. A simple thing such as a good head cleaning could make a large difference in sound. Wow, I felt important! Actually, I was lucky. I was mentored by a very precise, cantankerous old engineer, who I thought was tough on me.

But a lot of what he said and taught to me has been useful as a broadcast engineer for many long years. For example, one thing he mentioned was "don't be afraid of any piece of equipment, but respect it for any dangers it presents." In the studios, that may have been a runaway Magnecorder PT-6 tape deck rewinding. Or it could have been the high voltage from those purple tubes in the transmitter.

As my learning curve continued upward, I found networking with other engineers in the same and adjacent towns was helpful. Even as an audio production engineer I found, in most cases, the Chief Engineer of almost any station would take a telephone call and discuss whatever technical question I might have. True, your background from school and the application of many of the technical subjects you have studied all help deal with each day's challenges. And, hands-on experience is a great teacher. But we all know that if someone else shares some tips from their experience, these will usually save time and money.

In the early 1970's I started reading about a group of broadcast engineers in Binghamton, NY who were organizing the SBE, the Society of Broadcast Engineers. I decided to find out more about this group and soon became a member. At this time , I had advanced to Broadcast Supervisor of WRR-AM-FM in Dallas, Texas.

Over the years, I have never failed but to gain a lot of assistance from fellow SBE Members and value from my membership in SBE. I have found that one of my best networking sources has been the local SBE Chapter.

Today, broadcasting really has consolidated considerably. Where there were seven or eight engineers in a market, operating four or five stations, now there may be one or two. The increased responsibility certainly results in gaining greater experience daily, and can bring some level of confidence. Such a situation could still lead to isolation and problems. Yet, if you have a problem you can always call on a fellow SBE member or another local engineer for advice.

A local SBE Chapter is a good place to meet and discuss common problems with other engineers and members. As one might expect, the experience levels found at your local chapter will range from beginner to established expert. Yet, you will find that many of your fellow engineers have experienced many problems similar to yours, and are willing to share their solutions.

Overall, it is important to remember that while the number of engineers in the market has decreased, you are essentially a member of a professional group. Your survival and future jobs will be based on your application of good technical ideas, construction, maintenance and FCC Rules compliance. Take advantage of the resources found in your fellow engineers. Remember, don't be afraid to ask for help with problems. Most of us as engineers have had experiences that may help you work your way out of many, if not most, difficulties. In any case, show me an engineer that doesn't have at least an opinion! Good luck and keep learning.

Dave Hultsman has served as Chief Engineer of many radio stations, and now is the Broadcast Channel Manager for Continental Electronics. Recently Hultsman was appointed to the SBE Board of Directors. Contact him at dhultsman5@aol.com

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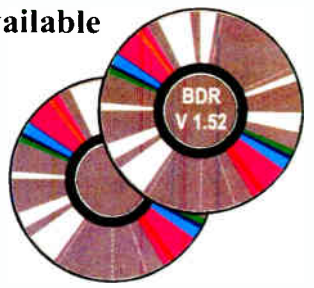

The **Broadcaster's Desktop Reference** (BDR) is an ongoing effort to provide useful tools, information, and history of interest to broadcasters. A work in progress – it seems something new is added almost every month.

Among the resources already available, you'll find: Barry's Radio Utilities, The Continental Electronics E-Slide, RF Specialties Toolkit, Tom Osenkowsky's Toolkit, Bob Carpenter's AM and FM/TV database viewer, Top Ten Lists, EAS paper sources, some project schematics, several files and pictures of broadcast history.

To make the CD even more valuable, when you are at the transmitter site, we have added the FCC and EAS checklists, and some equipment manuals. And this is not the end ... more is planned.

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Answers to Your EAS Questions

EAS Q&A

by Clay Freinwald with Barry Mishkind

[SEATTLE, Washington - September 2003] Do you have a question about implementing EAS in your area. Let us know! If Clay does not have the answer, he will point you to the right place to get one [Ed.]

Barry - Clay, we hear from many folks around the country saying EAS is dysfunctional, and in desperate need of an overhaul. Is this really the case and whose fault is it?

Clay - I feel it is unfair to criticize EAS with that sort of "blanket statement." Really, EAS is not so much a system but rather a technology used to varying degrees in each area of the country. What part of EAS is not functional? If we are talking the Federal Level of EAS – the distribution of Presidential Messages – this is one thing. On the other hand, if we are talking about the various voluntary facets of EAS, it is quite another. Certainly EAS can be improved. Here are a few of the ways that come to mind:

1. Upgrade the Federal Level distribution system, perhaps using satellite delivery that could be received and relayed by all the electronic media as well as common carrier systems.

2. Require all FCC licensed facilities relay certain life saving warnings.

3. Require all State and Local governments to fully implement EAS systems.

4. Provide federal level leadership and funding for implementing and training.

Such changes would go along way toward making EAS more functional, but I am unsure anyone is ready to pay their cost. In the meantime, EAS is there, ready for more to utilize more effectively. Those who have attended my EAS Workshops have heard me say the first place to look for a solution for EAS problems is in the mirror. I believe firmly EAS has the technology to do the job. The question is perhaps do we have the will and ambition to work to get it there?

AMBER WOES

Barry - We have received many emails from places where the state continues to use CEM for AMBER Alerts, even though CAE is the proper code. The usual reason for this is many have not upgraded their equipment. What can be done about this?

Clay - This is a problem in many locations, and another reminder how AMBER is in the voluntary portion of EAS. The FCC made it very clear no one had to upgrade their EAS equipment – a poor decision, in my view. Some states have rolled out AMBER using CAEs, and made it clear that code is what they are using, relying on peer pressure to get the upgrades accomplished. This method has a good deal of merit as it is doubtful any station want to learn an abducted child was found thanks to a listener who heard it on another station.

In some areas sources of funding have been found to assist stations unable to pay for the upgrades. It really is vital the proper event code be used at all times. Running an improper event code is very misleading and can cause a great deal of confusion and anxiety. Many areas have already discovered this the hard way.

Barry - I have been told one state does not use the LP's for AMBER, but rather uses broadcast FAX to distribute AMBER Alerts, avoiding the use of EAS all together. Is this OK?

Clay - Many areas feel EAS limitations make it unsuitable for handling AMBER and have sought other means. We need to think of EAS as a tool and not the whole toolbox. AMBER requires multiple tools to achieve its mission. Frankly, from a Broadcaster's perspective, I like the combination of EAS and Web Site for AMBER, with EAS being used as the alerting device or door-bell and the Web Site being used to distribute the specifics to the media and other interested or participating parties.

On the other hand, I have to wonder how a FAX system works with unattended Broadcast Stations. I have not heard of a device that will automatically interrupt a station and read a FAX. However, I could be surprised.

Barry - Me, too! On a more functional note, some folks are worried the new AMBER hierarchy will take over the area EAS system, as often some high power bureaucrats are the ones heading up the AMBER system.

Clay - Frankly, I am not surprised. Nevertheless, if an area has an active EAS community – SECC at the state level and LECCs at the local levels – with well thought out and implemented state and local plans, the integration of AMBER will be easy, as AMBER will just be another Event Code to deal with. However, the AMBER mission may well overtake weak or ineffective EAS plans. This should be a call to action for many who have been watching from the sidelines.

Barry - Nevertheless, as more and more AMBER Alerts are being initiated around the country, we are also hearing about more "misfires." Combined with worries about potential terrorist attacks, some have called for a general overhaul of EAS. Does this mean we should be preparing to be buying yet another expensive box to handle yet another system?

Clay - I would not worry about that – for the moment. Groups like PPW and MSRC recently have been issuing reports detailing what is right and wrong about our current state of public warning systems. These groups are looking at the big picture – a picture with a lot of 'holes' in it. After all, the EAS was a replacement for the EBS, whose real mission was a last ditch method for the President to address the country.

EAS was born from a mandate to the FCC to come up with a new system to work better with NWS broadcasts, un-attended broadcast stations, and other situations. Along the way state and local governments were told they were welcome to use the hardware if they desired (beyond the Federal aspect of EAS – in Part 11 – it is 100% voluntary).

Many feel EAS does not go far enough – especially after 9-11 – and they are rightfully concerned. A good public warning system is one going well beyond where EAS is as we know it, taking advantage of newer technologies as well as the present broadcast systems. Ask yourself the question: Would our pubic warning system be better off if Satellite Radio and TV systems were included, if all the NWR facilities were fully integrated, if every state and city were participating?

Perhaps we should think "outside the box" – beyond EAS – and start using the term Public Warning system. Our present, often under-utilized EAS system is often the only tool we have now. Looking ahead, we will see great improvements to our public warning systems; let us hope reverse compatibility will be kept in mind. I feel the existing EAS system has a lot of room for improvement, which can be done without having to replace the existing installed base of equipment.

However, be prepared for upgrades – it is virtually certain the most recent upgrade to add more event codes etc will not be the last.

Barry - Where can someone get more information about what PPW is proposing?

Clay - Check out the PPW Web Site - www.parnershipforpublicwarning.org I guarantee that you will find plenty to read there!

THOSE FIPS CODES

Barry - All right, Clay, here is a slow pitch: What are FIPS Codes and how to they work with EAS?

Clay - FIPS have been around for a long time. They are commonly called Location Codes. Each state and county (and some cities) has a FIPS code that represents that area or region. EAS employs FIPS as a means to identify specifically what geographic area an EAS message pertains to. Your EAS Box has the ability to decode and encode EAS messages directed to specific FIPS or location codes.

Barry - So, then, why are the county Sub-Divisions of these Local Codes not being used?

Clay - This is another example of the under utilization of EAS technology. Each county can be subdivided into up to nine segments. This is not the tic-tack-toe, equal segments many think of, but rather two to nine specific areas of a county.

The reason this technology is not being used is likely two-fold: The installed base of EAS decoding receiving equipment that can program their location using the sub-divisions is tiny, and governments are not going to invest in a system that is not fully developed.

NWS TO TAKE THE LEAD?

Barry - I had heard a report where NWS (the National Weather Service) was going to use the county subdivisions, what happened?

Clay - NWS made an attempt a couple of years ago to utilize this capability by integrating their forecast zones into the scheme. There are a few places where it is used, but it has not really caught on, or so it appears.

Barry - It would seem NWR (National Weather Radio) might be the best method to deliver EAS warnings, but are there not many areas still without NWR service?

Clay - According to my sources at NOAA, there are now some 811 Stations on the air with 54 new ones being recently added. There is quite an effort being made to expand NWR to cover the whole country, as many share your view. In some states – Washington State, for example – there are public and private parties assisting in expanding NWR.

Barry - How can someone find out more about NWR coverage?

Clay - Check out the following website: http://205.156.54.206/nwr/ or you can go to the NWS Home page and click on Weather Radio.

Barry - What about NWR receivers, will they all work with NWR facilities integrated into EAS systems?

Clay - Here in Washington State we tested a number of NWR Receivers and found a number of them unable to decode all the Event Codes used by EAS and in some cases will not decode any messages whose originator is not NWR. The results were forwarded to NWS and they are working on the issue. Hopefully, the time will come when you will be able to purchase a NWR receiver that takes advantage of the technology EAS has to offer. Here in this area (Seattle) this is very important to us as NWR already broadcasts all EAS messages.

Barry - I understand "Craig" the automated voice on NWR, is being replaced. Who is the new one?

Clay - NWS calls him "Tom."

HOLLYWOOD AND EAS

Barry - Michael Barnes recently called to our attention a movie on PAX where a young fellow bypassed the NWS, taking over a local station with his CB radio to warn the public about a storm using the "Emergency Broadcast Service." Michael points out "such movies are not helping" and are a disservice to NWS and EAS.

Clay - I have to agree with Michael; there appears to be a lot of misinformation about EAS. A recent piece on 20/20 made it rather clear they too did not understand the EAS mission, nor how it is to work. Nationally, there is a severe shortage of authoritative information about EAS. Perhaps some central place for EAS information is needed. The best current source about EAS is the one done for the MSRC by former FCC EAS Honcho, Frank Lucia.

Clay Freinwald, Senior Facilities Engineer for Entercom in Seattle, is Chairman of the SBE's EAS Committee as well as chair of the Washington State SECC. He welcomes your questions about EAS at k7cr@wolfenet.com

Radio War Stories

WCSM Floods

The Community Comes Together to Save "Their" Station

by Dan Dietz

In many places stations have lost contact with their local communities, often trying to serve larger cities many miles away. Many have decried this trend. So, what will the "locals" think when the station in their town is threatened by water literally "lapping at the door?" In Celina, Ohio, WCSM found out. [Ed.]

[CELINA, Ohio - September 2003] Have you ever wondered what it really means to give service to your community of license? Have you ever wondered if any body was listening "out there?" Have you ever wondered if anybody ever really cared about what you do? Well, WCSM AM/FM Celina, Ohio had the opportunity to see these questions answered in the aftermath of the flooding that occurred here from July 7th through the 17th.

WCSM is a very community oriented station. They do network news on the hour, local news on the half hour during morning hours, noon and evening. They do obituaries in the evening news. At 12:30 on weekdays, WCSM invites local guests into the studio to talk about local interests on the "Spectrum" show. Another daily program: "Service and Music" provides an opportunity where local folks can advertise personal items they would like to sell or buy. WCSM also covers all local sports including basketball, football, baseball, volleyball, and whatever else might come along.

WCSM, Celina, Ohio in Drier Times

Courtesy: Fred Vobbe

RISING TROUBLE w

On Monday, July 7, the morning DJ/News anchor was met with a partially flooded parking lot with water from Beaver Creek, normally a small stream running along side of the station to drain the overflow from Grand Lake in St Marys (in Mercer County, OH) State Park. Heavy rains had begun three days earlier (July 4th) and flooded the 14,362 acre man made lake (at one time used to feed the old Miami – Erie Canal).

The lake eventually went 22 inches above normal. It seemed as though all this extra water went down the Beaver Creek and flooded the entire area around the stations. The AM transmitter had to be shut down – water was already in the doghouses. The AM programs continued on cable and along with the FM (the FM transmitter was located elsewhere) served as the main communications link to the public with emergency information from local officials.

The next day, July 8, the parking lot was totally flooded. Employees, led by the station owner, were able to park across the road and wade knee-deep water to get into the station. The almost joking comments about wading into the station by air personnel brought phone calls from local officials and many local residents asking if they could help.

LOCAL HELP KEEPS STUDIOS DRY

Sand bagging began late Tuesday and went on into the night while even more storms and heavy lightning were pounding the area. Ten pumps were brought in to keep the water out of the building. Volunteers and employees worked through the night as waters kept rising. At one point, the sandbag dam broke and water started to enter the building.

Just as all seemed lost, a pay loader was seen bringing more sandbags to repair the wall! Computers and other equipment had already been blocked up off the floor just in case the water did come into the building. Still, it was a hard fight against the water: The pumps had to be manned 24 hours a day and refueled every two hours.

Surrounded by Waist High Water

On Wednesday July 9th, the rains seemed to subside a bit, the pumps were doing their job, and volunteers were bringing food and supplies – yes, the volunteers also waded through the water to help. More rain was being predicted. Heavy equipment was brought in to move the office furniture and files to a room in the courthouse, which the county commissioners donated to the station "for as long as they needed."

Since the road had been blocked off since late Monday, employees and volunteers had to park nearly 3/4 mile from the station and wade in knee-deep water. Some wore hip waders; others wore sandals and shorts. The creek was now at least a mile wide! The antenna field was totally under water. Each of the four towers was surrounded by six foot high dog-eared fences. Tower #2 had only six inches of fence showing; # 4 was nearly as bad. Towers #1 and #3 had four feet of water covering the bases.

Thursday July 10th saw more rain during the night but everyone kept working. By this time, the Celina area had seen nearly 12 inches of rain since July 4. Finally, late in the day the waters began receding. Things were looking up! By Friday, the sun poked through giving a ray of hope that all was nearly over. Saturday was even nicer, a whole day of sunshine. By now the water was down enough to stop the pumps.

CLEANING UP THE MESS

As the waters went down, the full extent of damage could be seen and the cleanup began. The sand bags were left for another week. The carpet was removed as it was covered with mud and was soaked. The office staff returned to work at the studio on card tables while the cleanup was being accomplished. Little by little some files were brought back to the studio. The desks and other furniture would wait until re-decorating and new carpet installed.

Using water hand carried out to the towers, the Doghouses were washed out using a weed sprayer. After carefully cleaning each of the antenna tuning units, the AM returned to the air on July 16. At first, we only were able to use the night power from an LPB-30 transmitter as lightning had shorted a blower in the Collins 20V-3 main transmitter. Finally, a new blower was installed on Thursday July 17 and the AM was returned to full power. Parameters were amazingly close to licensed values. Damage to the AM system was limited to two base current meters, a blower in the transmitter and the tower fencing which will probably have to be replaced.

Of the four phone lines to the studio, only one had a problem. Of course, it had to be the main phone line – Murphy strikes again! While this caused a few problems, all was back to normal by week's end. Fortunately, through all of the storms and the flooding, there were no major power outages. Some power surges did occur, but power never went out for than a few seconds.

APPRECIATION

At an Appreciation Dinner on July 31, employees were allowed to comment on their thoughts. One thing stood out above everything else: what the community gave back to the station in their time of need without being asked. The County Commissioners, the Sheriff's department, the Local police, the EMA, and many volunteers all came forward to keep the station on the air. None were asked to help. *They just wanted to help!* Possibly there may have been several hundred in all. Many were unnamed. Without their help, the station would have been "off the air" for some time.

All of us at WCSM extend a truly heartfelt "Thank You!" to our community of license.

Dan Deitz is a contract engineer based in Wapakoneta, OH, and CE at WSCM. He can be contacted at dandietz@bright.net

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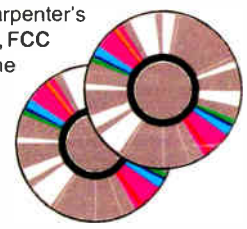

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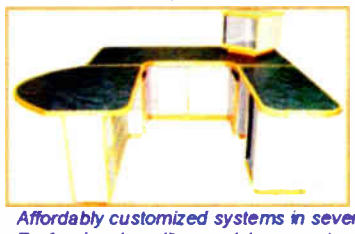

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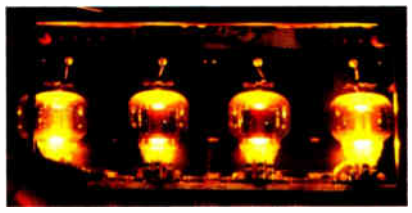

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www.wi-broadcasters.org

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Bos-Con SBE Regional – October 28-29 – Boston
www.sbe11.org

CBI Convention – November 6-9 – Dallas
www.collegebroadcasters.org

"Field Notes"

Letters From Our Readers

From: Chuck Lund – Waterbury, CT

Thank you for the wonderful years of **Radio Guide**. I have retired and turned my production business over to my oldest son. I give him all my copies of RG when I am through with them, and told him to get his own subscription. I hope he does.

I retired from Radio as a an Oldies DJ back in 97' but continued my own Production Business until just a month ago. I was also an Engineer at two of the local stations.

I have picked up some very helpful information over the years through RG. I have seen many changes with your great paper. I have saved most of them, from the first one on down the line. I missed them when you took that break from publishing a few years back, but was glad to see the return.

I will always have my memories of RG and how its technical articles helped me get out of a jam or two. Thanks for a wonderful paper, and I wish you great success with it.

[RG replies: Whatever else we may do, it is publishing technical articles to help solve problems that give us the most satisfaction. Thanks for the kind words.]

From: Jack Taddeo – Park Ridge, IL

I just wanted to send you a compliment on the last few issues of **Radio Guide**. This August issue, especially, has been great reading. The continuing column by Cornelius Gould has been fantastic. I am not an engineer but I am an owner-operator who enjoys that part of the biz. I have learned a *lot* from his columns.

Ken Benner's stories from the field (as an owner I can appreciate everything he is passing along), and Don Kimberlin's article on lightning ... all fantastic. And useful.

Thanks again for a great publication. It is read cover-to-cover as soon as it arrives and then saved for future ref!

[RG replies: Glad to hear you've noticed the changes we've made. We'll be adding additional pages and technical articles, in the coming months.]

From: Chuck Crouse, Pres/GM
WLMI (FM) – Kane, PA

If I understand his article in "Our House is a Very, Very Fine House" *[Radio Guide August-2003]*, John Devecka feels that he must buy higher priced CD players for the studio of his student station because the students won't respect the lower-priced units they recognize.

Assuming that many of those students will find entry-level jobs at small stations, whose budgets dictate low-cost equipment, they'd do well to get used to it now. And if "failure to respect" is a euphemism for "abuse," the students need to be told that if they abuse equipment, they'll lose studio privileges. If they're students, they can be given failing grades. In the "real world," the equivalent is being fired.

[John Devecka replies:

While I understand Chuck's point, I think he misinterpreted my explanation. College students turn over fast, and you want them to understand and respect the equipment. A mid-priced "Pro" grade unit achieves the durability and the "look" that is needed in a high turn over, heavy usage environment. Frequently the choice of consumer-grade (sub $150) CD players is made because there is a staff engineer that can swap them out easily and cheaply, or there is an automation system handling the bulk of the audio duties. I have found little return in using these, because they are not designed for the 24/7 life required and their loss means major problems in the studios. When the studios are used for live DJs and classes, the equipment needs to be more robust. The mid-line Denon DN-C630 units have all of the controls that the students need and are priced at about $470 (street price). I have a lot of experience with these in many stations and am satisfied that they can take the abuse of general operation and hold up. Students that abuse equipment are removed from the station. But, as I mentioned in the article, there are two schools of thought on this and it is unlikely they will ever wholly agree! – John Devecka, WLOY Operations Manager]

Things You Need to Know

Computers, Viruses and Radio Stations

At the end of August, another email virus quickly spread around, clogging systems and forcing many to shutdown and reboot. The culprit this time: the SoBig virus. As with similar viruses, this one looks for the user's email address book, and sends out email after email. This one also "spoofs" the "From:" address by taking real addresses at random. (It could even be yours, without you being infected!)

SoBig also contained a Trojan Horse program, bringing dire predictions of an Internet attack; but not much happened at the hour designated for the "attack."

In checking the IP addresses on some of the hundreds of virus driven email received here, it was interesting to note only a dozen or so IP addresses were evident. One of the most prolific came from a computer at an Eastern radio station. Fortunately, a single email was able to stop the majority of the incoming messages. To the station's credit, their system was set up to strip virus attachments, so the virus messages were already "tame."

Nevertheless, aside from the "flood" of email generated by taking over address books, viruses can cause a lot of trouble. Last year, a large radio corporation was hit by a different bug. In addition to trying to infect other machines, this one looked for printers on the network and printed page after page of gibberish.

Network Printers Gone Wild

Starting with one person (thought to be in the NW) opening a virus, facilities in many cities found their networked printers had gone "nutsoid," running through reams and reams of paper, until the machine ran out. Yes, network sharing was cut off promptly.

While the solution seems so simple and clear to most of us who have experienced viruses and their effects, apparently there are hundreds of new hires each year that simply can not resist clicking on links in email. The result is an infected computer. And sometimes an entire facility gets hit hard.

In other cases, a "convenience feature" can turn into a real system killer. Some email readers have "preview" panes, which open all or part of an email automatically. This time saving feature will indeed save time: it will instantly infect a computer!

No Previews Please

Our advice? Turn off "preview" features. Instruct co-workers never to open attachments – even from names they recognize. If you are the System Administrator, ensuring all systems in the facility are running an up-to-date virus scanner is a good idea.

One SA programmed his system to check regularly that no one had turned off the auto-update feature of the AV program. (Some SAs go as far as stripping all attachments on incoming email, on the theory that new viruses may not yet be in the database.)

Have you found other effective ways to protect your facility from viruses and their payloads? If so, let us know, so we can share them with everyone!

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Thursday, October 2
Keynote Address

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Group Executive Session

Moderator
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ABC Radio Networks

Group Executives Including:

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